DEPARTMENT OF RURAL ECONOMY
UNIVERSITY OF ALBERTA
EDMONTON, — ALBERTA
T6G 2H1

Digitized by the Internet Archive
in 2017 with funding from
University of Alberta Libraries

https://archive.org/details/faminow1977

THE UNIVERSITY OF ALBERTA

BEEF PROCUREMENT BY EDMONTON RESTAURANTS

by

MERLE DOUGLAS FAMINOW

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
AND RESEARCH IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

DEPARTMENT OF RURAL ECONOMY

EDMONTON, ALBERTA

SPRING, 1977

ABSTRACT

The demand for food eaten away from the home has been a rapidly increasing portion of total food consumption in Canada. Most estimates suggest that presently one third of all meals are consumed away from the home and that this will reach one half by the early 1980's. Correspondingly, the amount of beef consumed away from the home has also increased and is expected to continue to do so. At least partially responsible for the recent expansion has been the development and extension of specialty fast service restaurants.

The first part of the study discusses beef quality and highlights some of the more important determining factors of beef quality. Consideration is given to tenderness, flavor, and juiciness along with carcass cutability. The second section describes the market system for cattle and beef in Canada with special reference to Alberta and the restaurant industry. The processing and market functions carried out by packers and purveyors are also discussed. The third section summarizes the findings of detailed personal interviews with the management staff of selected Edmonton restaurants. Also considered at length is the question of beef imports, their nature and impact on the Canadian cattle economy. Regression analysis is used to estimate the impact of beef imports.

The research for this study was primarily done during the summer months of 1976. The main source of data was a

series of personal planned interviews with packing firms, purveyors, and restaurants within the City of Edmonton. The study was primarily concerned with restaurants specializing in high volume fast service beef cuts although an effort was also made to allow the sample to be cross-sectional in perspective.

ACKNOWLEDGEMENTS

I would like to thank the many people in the beef industry who provided time and information so that this study could be completed. Their cooperation was both necessary and appreciated.

Thank you also to the staff of the Department of Rural Economy. The help of Clare Shier, Ronn Bence, Evelyn Shapka and the secretarial staff was needed during some part of the study.

My supervisor, Dr. Murray Hawkins, provided a tremendous amount of help and guidance throughout my M.Sc. program. I am indebted for his advice and criticisms but most of all for his keen insight into the beef industry. It was an enjoyable and rewarding experience to study and work with you Murray.

TABLE OF CONTENTS

PAGE

ABSTRACT i

ACKNOWLEDGEMENTS iii

LIST OF TABLES iv

LIST OF FIGURES viii

CHAPTER

I. INTRODUCTION 1

The Problem 4

Objective of the Study 7

Methodology of the Study 7

Outline of the Study 9

Weaknesses of the Data and Study 9

II. GRADING AND DETERMINANTS OF BEEF QUALITY 11

Introduction 11

The Economics of Grading 12

Beef Quality 15

Cutability 23

III. THE MARKETING SYSTEM AND MARKET CHANNELS FOR ALBERTA BEEF 25

Introduction 25

Beef Production 28

Beef Processing 37

IV. AN ANALYSIS OF THE EFFECT OF BEEF IMPORTS ON THE CANADIAN CATTLE ECONOMY 59

The Problem 59

Objectives 59

Rational and Scope 61

Methodology 72

Empirical Results 80

V. BEEF PURCHASING BY RESTAURANTS WITHIN THE EDMONTON AREA 88

Introduction 88

Beef Purchasing Patterns 93

VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 104

Summary 104

Conclusions and Recommendations 104

Recommendations Concerning Future Research 109

REFERENCES 111

APPENDIX A 116

APPENDIX B 124

APPENDIX C 129

APPENDIX D 131

LIST OF TABLES

TABLE PAGE

3-1a. Beef Carcasses Graded In Canada By Province - Number, 1975 30

3-1b. Beef Carcasses Graded In Canada By Province - Percentages, 1975 31

3-2 Numbers of Beef and Dairy Cattle on Farms, 1961, 1971, 1974)T1 32

3-3 Inspected Beef Slaughter, 1961-1974 33

3-4 Breakdown of Beef Sales By Edmonton Packers, 1976 40

3-5 Geographical Source of Beef Procured By Edmonton Packers, 1976 41

3-6 Percentage of Grade Broken Into Primal Cuts, 1976 47

3-7 Form of Beef Procured by Purveyors, 1976 52

3-8 Institutional Source of Beef to Purveyors, 1976 53

3-9 Average Warm Weights for Inspected Slaughter in Alberta, 1975 54

3-10 Beef Breaking Activities of Purveyors, 1976 55

4-1 Canada's Trade In Agricultural Products 1966-1975 62

4-2 Imports of Beef and Veal, Fresh, Chilled or Frozen Boneless, 1968-1976 65

4-3 Number of Cattle In Australia, 1968-1974 68

4-4 Beef Imports - Quantity, Value, Price, Percent Market 1969-1975 75

4-5 Regression Results I 81

4-6 Regression Results II 84

4-7 Regression Results III 86

5-1 Sales Breakdown by Restaurant, 1976 91

5-2 Type of Service and Customer Turnover, 1976 92

5-3 Source of Beef, 1976 95

5-4 Farm Prices and Farm Value Equivalent of the Wholesale Carcass and Retail Cuts, 1974 97

5-5 Type of Cut Purchased By Restaurants, 1976 99

LIST OF FIGURES

FIGURE PAGE

3-1 Marketing Channels 27

CHAPTER I

INTRODUCTION

Changes in the consumption of food over time have tended towards more services and processing of raw products rather than increased per capita consumption.[1] One aspect of this change would be the general increase in the amount of meals eaten away from home. Factors such as increased urbanization, mobility, and income, along with a general increase in the number of women in the labor force have contributed to increasing the demand for meals eaten away from home. It has been estimated that currently one quarter to one third of all meals are eaten out in Canada and that by the 1980's this would be expected to reach one half.[2] This is similar to the reported American situation.[3]

One might expect, therefore, that as the number of away from home meals increases, the quantity of beef consumed by the HRI trade will also increase.[4] Alberta, being a major producer of beef cattle, could expect to reap considerable benefits if the HRI market were to be more fully exploited, particularly if the total demand increases. Thus increased

---

[1] Kohls, R.C., Downey, W.D., *Marketing of Agricultural Products*, The MacMillan Company, New York, 1972.
[2] Dodds, Harold, "Canada Gains In HRI Trade," *Cattlemen, The Beef Magazine*, March, 1976, p. 10.
[3] McLamore, James W., "Upcoming: 50% Meals Eaten Out?" *Chain Store Age Executive*, September, 1975, pp. 71-73.
[4] Williams, Willard F., Stout, Thomas T., *Economics of the Livestock-Meat Industry*. The MacMillan Company, New York, 1964. HRI refers to hotel, restaurant and institutional trade.

knowledge of the demand characteristics for beef of the HRI Trade could be an important contributing factor to increasing Alberta's share of the beef market.

A discussion of imported beef is relevant within the scope of this study because imported beef goes largely into ground beef patties and economy steak cuts for Canadian restaurants. Beef imports into Canada from Australia and New Zealand over the last seven years have represented about 5 to 8 percent of Canadian beef consumption.[1] In addition, they have shown periodic fluctuations in quantity and price within given time periods.

Of current interest to Canadian restaurants, beef producers and this study are the past and present composition of beef imports. In addition, their magnitude and expected future prospects will be evaluated.

Upon consideration it appears that potential exists for unstable and depressed Canadian cattle and beef prices as a result of beef imports. The government appears to be concerned that the high levels of beef that have entered this country have indeed created market instability and depressed prices. This is indicated by the imposition of import restrictions on beef from Australia

---

[1] Dawson,Jim, "Canada's Beef Trade." Unpublished report, Alberta Department of Agriculture.

and New Zealand.[1]

There would appear to be at least two reasons why concern is being expressed: first, it is alleged that large quantities of imported beef tend to depress Canadian cattle and beef prices, and second, accusations have been raised that New Zealand and Australia are "dumping" their beef in the Canadian market at unfair price levels.[2] Indeed, this may be a reflection of a specific Australian government policy where U.S. sales contracts are awarded to Australian firms making sales to other countries.[3] At present, the United States purchases a substantial portion of Australian and New Zealand beef but has limited imports in terms of voluntary quotas for a number of years. Recently these restrictions became manditory. Thus, as an export expansion policy, Australia has offered contracts for U.S. sales to firms which make sales to other countries, including Canada. It is hypothesised periodically that this policy has provided incentive to Australian firms to "dump" beef in the Canadian market in order to obtain a larger U.S. contract. Thus, it appears timely to attempt an analysis of the problem in the hope of understanding the nature of Canadian beef imports and their effect on domestic cattle and beef

---

[1] Numerous articles on this subject have appeared in the Canadian press. One such article can be found in: *Toronto Globe and Mail*; Thursday, October 14, 1976, B.5.

[2] Dawson has argued that beef is landing C.I.F. in Montreal at a price considerably below C.I.F. New York, for the same type of beef. Dawson, *Op. Cit*.

[3] Dodds, H., "Meat Imports Bring Clash." *Cattlemen: The Beef Magazine*, August, 1976, pp. 18-33.

markets.

The Problem

Although the demand for food consumed away from home currently accounts for one third of all meals and is growing, little information is available on the beef purchasing practices of members of the HRI trade in terms of the price, quantity and quality demanded. The lack of information would appear to stem from several sources. One is that governments publish little descriptive information, partly due to the recent growth of the food service industry into a larger portion of total beef demand. A second reason originates from the industrial structure of the HRI trade. It contains many small firms and is heterogeneous with respect to factors such as: size, service, product, price, and customer turnover. Thus it is difficult for the industry to express and outline information in a general manner.

The problem therefore is essentially one of a lack of accurate and applicable information about beef procurement by the HRI trade. The primary emphasis of this study will be directed towards the restaurant sector of the HRI Trade.

Need for Research

Williams and Stout conclude that little is known about the volume of meat taken by the HRI Trade in the U.S.

other than that it is large and expanding.[1] This appears to largely be true in Canada where even less is known about the volume and quality of meat purchased by the restaurant business. Documented research and information on the restaurant business in Canada is disjointed, sketchy, and not readily accessible, thus there is a need to outline and quantify the marketing channels for beef flowing into the restaurant trade.

Restaurant chains specializing in fast food have become a more prevalent part of the restaurant business. Fast food chains had 24.3 percent of U.S. restaurant sales in 1973 versus 16 percent of sales in 1971.[2] In recent years some restaurant chains have grown from small regional companies into large multinational corporations. For example, a chain specializing in fast service hamburgers has experienced a five hundred percent increase in world wide sales during the five years from 1969 to 1974 and has averaged a per unit expansion of approximately twenty percent per annum.[3] In 1975, that firm had 3500 North American outlets, 2,200 of which were franchised, virtually all developed since the middle 1960's. Other chains have shown similar, although perhaps not such dramatic growth. Fast service outlets tend

---

[1] Williams, Stout, Op. Cit.

[2] Vaughn, Charles L., "Growth and Future of the Fast Food Industry." Address to the Annual Marketing Conference, Atlantic Pizza Delight Franchises, Hilton Hotel, Montreal, April 19, 1976.

[3] Couch, Brian, "Hold the Lettuce." Financial Post 69:19, October 18, 1975.

to be specialized with respect to products. Thus there is a need to consider the effects the growth of the fast food restaurant industry has on the beef industry.

It also would appear useful to research and outline the quantity, quality, and price of foreign beef entering the restaurant trade. Earlier research suggests that imports from Australia go primarily into the processed meat industry (hamburger patties and sausage) and a noticeable volume of wholesale cuts originating from the United States flow into the hotel and restaurant trade.[1] It would therefore appear timely to document and describe the entrance of imported beef into the Canadian restaurant market.

---

[1] Smith, K.D., Berg, R.T., Hawkins, M.H., Stiles, M.E., McFadyen, S.C., The New Beef Grades, Rural Economy Bulletin (Applied Research), The University of Alberta, Edmonton, Alberta, 1975.

Objective of the Study

The primary objective of this study is to increase the quantity and quality of knowledge about the food service industry's demand for beef. More specifically, the objectives of the study are:

1. To describe and analyze the demand variables for beef of selected restaurants.

2. To describe and analyze the quality and quantity of foreign beef entering the Alberta restaurant market. It is an objective of this study to use regression analysis on beef imports to interpret the interrelation between imported beef and the Canadian beef economy.

3. To determine the constituents of beef quality in relation to beef purchases of restaurants.

4. To investigate the market channels for beef entering the HRI trade.

Methodology of the Study

The study is undertaken in three parts. The first section provides a theoretical discussion of beef quality, grading and cutability. This is followed by a section outlining the market channels for beef entering the food-service industry quantifying, where possible, each channel. Information has been procurred from several sources including past scientific research, government publications and personal open-ended interviews with packers, purveyors, and restaurants. The third portion investigates beef purchasing by restaurants located in Edmonton, concentrating

for the greater part on restaurants specializing in fast service.

Hypothesis

At the outset of the study a number of "a priori" hypotheses were developed, some from economic theory and others from previous institutional study. It was hypothesized that:

1. Price is the most important variable in the aggregate demand function for beef of restaurants, but factors such as beef quality, institutional buying patterns, and availability of supply would override price as the more determinant factors, upon occasion.

2. Restaurants in the Edmonton area demand primal cuts from a heavier carcass than is generally produced in Alberta or Canada, necessitating imports.

3. Beef imports form a large portion of the beef purchased by restaurants.

4. A1 and A2 graded carcasses are less satisfactory to the food service industry because they have neither sufficient marbling or fat cover.

Outline of the Study

Chapter II briefly outlines the question of beef quality and attempts to provide a background from which the Canadian grading system and beef purchases by restaurants can be critically appraised. The emphasis of the chapter is on quality characteristics of beef rather than the scientific principles of animal science.

The third chapter outlines the cattle and beef marketing systems in Canada. Particular emphasis is placed on those channels tied directly to the HRI trade.

Chapter IV investigates Canadian beef imports with both descriptive and analytical methods. Several econometric models are used to estimate the impact of beef imports on cattle prices.

Chapter V pertains to actual beef procurement by restaurants and contains the summary of open-ended interviews with industry members. Related to Chapters III and IV is Appendix D where a detailed study is made on the effects of beef imports on the Canadian market. Chapter VI summarizes the results of Chapters II through V.

Weaknesses of the Data and Study

Much of the information was collected through formal interviews with packing plant, purveyor, and restaurants personal. These are privately owned firms and are reluctant

to divulge information that could be used to their detriment by competitors; thus actual prices and quantities of beef sales and purchases could not be disclosed. In addition, firms were often reluctant to name their customers or suppliers so that some results were impossible to follow up.

A second weakness is that government and industry statistics are sketchy and insufficient. Determining the inter-industry and intra-regional flows of beef is not possible with the present data. Furthermore, when exact quantities are known, like beef imports, information is often not disaggregated to a meaningful level so that proper analysis is possible. This appears to be the case with imported beef where it is possible to report exact quantities from Oceanic countries that land in Canada but the provincial breakdown of final consumption is not obtainable.

CHAPTER II

GRADING AND DETERMINANTS OF BEEF QUALITY

Introduction

Beef is purchased by restaurants as an intermediate good. It is processed and sold to customers as a final consumption good. Thus, it is necessary to include, within the context of the restaurant demand for beef, a discussion of major determinants of beef quality and their relationships to the beef purchase decisions of restaurants. The analysis of beef quality in a restaurant's perspective is done on two distinct levels. The first level of analysis occurs in the packing plant where federal beef graders determine which grade will be assigned to carcasses as outlined in the Federal Grading Act.[1] The second level occurs because restaurants predominantly purchase primal cut or portion controlled cuts and tend to outline their own standards based on meat specifications they judge as preferable.[2]

The analysis of beef quality at both levels is complicated by a variety of measures some of which are objective and others which are subjective and not readily quantifiable. Furthermore, the type and quality of preparation can be a factor in determining the palatability

---

[1] The specifications for Canada's grading system are outlined in Appendix C.

[2] Evidence to substantiate this will be provided later in this study.

of beef to the consumer. In addition, taste is a personal factor influenced by factors such as aroma, appearance of the meat, or health of the consumer. It follows therefore that there are differences within the academic profession, the meat industry, and consumers as to what constitutes beef quality.

This chapter first discusses grading and its applications in determining beef quality, followed by a description of some major features of beef quality and conformation. The analysis will be brief, drawing out factors that appear to be readily applicable to the restaurant industry.

The Economics of Grading

A grading system is an arbitrary method of classifying products so as to differentiate them into different categories, each one displaying similar characteristics. A vehicle is thus provided for indentifying by description the products desired and facilitating the fulfillment of the diverse array of consumer preferences. Kohls and Downey outline some of the more salient advantages of standardizing quality of agricultural products:[1]

1. It results in more meaningful price quotations.
2. It makes possible the sale of goods by sample or description.

---

[1] Kohls, Downey, Op. Cit., pp. 266-267.

3. It enables the pooling or intermingling of products for future shipment and thereby aids the concentration process of marketing.

4. It facilitates financing and risk bearing in marketing products.

5. It may reduce relative transportation costs.

6. It may increase the demand for certain products.

7. It may help maintain effective competition.

In more theoretical terms, Williams and Stout have noted two of the more basic economic objectives of grading as being:[1]

1. Reduction of marketing costs and operational inefficiency.

2. Increasing pricing efficiency.

Further, the basis for grading may be determined if:[2]

1. One cr more basic quality attributes exist that are important to a significant number of purchases.

2. Variations cannct be determined readily and accurately by consumers and buyers at the time of purchase.

3. These attributes are important to buyers in terms of differences in the price they are willing to pay.

Kohls and Downey went on to suggest criteria for good standards which may be used to judge the adequacy of a standardization system.[3]

---

[1] Williams, Stout, Op. Cit., p. 467.
[2] Ibid, p. 479.
[3] Kohls, Downey, Op. cit., p. 268.

1. Standards should be built on factors that can be accurately and uniformly measured and interpreted.

2. Standards should be built on important and easily recognizable characteristics.

3. These factors and terminology should make the grades meaningful to as many users of the product as possible.

4. Each grade classification should include enough of the average production to be a meaningful category.

5. The cost of operating the grading system must be reasonable.

The benefits of a grading and standardization system will be better accrued if the system is based upon sound economic reasoning as outlined above. Clearly outlined specifications are necessary to the food service industry because of at least two reasons.[1] First, the food service industry must purchase to specification and serve a uniform product both in terms of quality and quantity because it is selling a consumer product. Extreme variance in either quality or quantity would prove disruptive to preparation techniques and to consumer acceptance. Second, a level of quality acceptable to consumers is an important factor to be maintained by restaurants because of the possibility of losing customers.

---

[1] Kahrl, William L., Introduction to Modern Food and Beverage Service. Prentice-Hall Inc., New Jersey, 1976.

Beef Quality

Beef quality is difficult to appraise and quantify with an acceptable level of accuracy, but regardless, meat researchers have devised methods of appraising it. Studies usually comprise of two areas: objective tests including measures such as shear force determination, press fluid, color readings, and pH determination, and subjective measures such as texture, aroma, flavor, juiciness, tenderness and overall acceptability obtained through the use of trained taste panels and consumer surveys. The goal of this research is to be able to predict, on the basis of objective standards, the eating quality of a beef animal and of its individual cuts. However, at present no single chemical or physical measurement has been developed that will accurately reflect the eating quality of beef, although some have been developed to measure individual factors.[1]

The task of appraising beef quality becomes more difficult once the researcher moves into the realm of consumer preference studies because of the variety of consumer tastes, preferences, and cooking methods. Juillerat

---

[1] American Meat Institute Foundation, The Science of Meat and Meat Products, W.H. Freeman and Co., San Francisco, 1960, p. 212.

and Kelly[1] reported that consumer preference for beef in the U.S. was not closely aligned with American beef grades while Hawrysh, Howes and Berg[2] were unable to find quality differences between regular beef (animals aged two years) and more mature marbled beef (animals reaching five years in age). The Juillerat and Kelly study points out that beef appraisal by the experts may not coincide with consumer tastes and preferences while the Hawrysh report indicates that measures considered in determining grades in Canada may be meaningless with respect to consumer preferences. Both studies used consumer surveys and trained taste panels.

Appraisal of Beef Quality

The Canadian beef grading system judges the grade of a beef carcass through a number of subjective measurements. These include color, texture and marbling of the lean meat and the color, texture and distribution of the fat cover. In addition, the graders attempt to visibly evaluate the carcass muscling with respect to muscle deficiency or lack of deficiency.

As a beef animal becomes more mature, the lean tends to become darker, less tender and assume a more intense meat

---

[1] Juillerat, M.E., Kelly, Robert F., "Quality Traits Associated With Consumer Preference For Beef." Journal of Food Science, Volume 36, 1971, pp. 770-773.
[2] Hawrysh, Zenia J, Berg, R.T., Howes, A.D., "Eating Quality of Mature Marbled Beef." Canadian Institute of Food Science and Technology Journal, Vol 8, No. 1, 1975, pp. 30-34.

flavor.[1] It follows that color of the lean may be an indirect indicator of tenderness and flavor through this correlation with age, but there does not appear to be a direct or causal link between the color of lean and beef quality. However, the lean color does affect retailer, wholesaler, and consumer acceptance of beef. Losses in the accuracy of muscle color as a guide to eating quality occur from factors such as oxidization processes, exercise by animal and type of feed (in young animals), all of which can influence the color of beef.[2]

The fat color bias in the beef grading system is linked to two sources: the physical property of beef animals where fat tends to become more yellow as the animal matures, and the belief that grass fed animals will be of inferior quality. The animals feeding pattern can affect fat color because green pasture contains carotene which is known to cause yellowing of cattle fat.[3]

Texture of lean and fat are contentious issues which receive little support from the academic profession but

---

[1] Yeates, N. T.M., Modern Aspects of Animal Production, Butterworths Inc., London, 1965. Tuma, H.J., Hendrickson, R.L., Odell, G.V., Stephens, D.F., "Variations in the Physical and Chemical Characteristics of the Longissimus Dorsi Muscle From Animals Differing in Age" Journal of Animal Science, Vol 22, No. 2, 1963, pp. 354-357. Walter, J., Goll, D.E., Kline, E.A., Anderson, C.P., Carlin, A.F., "Effect of Marbling and Maturity on Beef Muscle Characteristics." Food Technology, Vol 19, No. 5, 1965, pp. 159-167.

[2] Yeates, Op. Cit.

[3] Ibid

remain as factors considered in beef quality appraisal.

Subjective tests, usually made through use of trained taste panels, consumer surveys, or both, tend to rely upon evaluating the physical properties of the meat and preparing the cuts in a controlled environment in order to eliminate any differences created by dissimilar preparation. The three quality attributes usually measured are tenderness, juiciness and flavor. Tenderness is considered the attribute most important to consumers by the literature and receives more extensive discussion.

Tenderness

The age of the animal at slaughter has been found by researchers to be the dominant variable affecting tenderness or lack of tenderness in bovine meat.[1] Indeed, Berg and Cole argue that age is the sole factor affecting tenderness that can realistically be applied to predict the tenderness of beef.[2] More mature animals are generally less tender than younger ones although this relationship is not exact and need not be statistically significant over narrow ranges of animal age. Norris, et al, investigated the tenderness of

---

[1] Martin, A.A., Fredeen, H.T., Weiss, G.M., "Tenderness of Beef Longissimus Dorsi Muscle From Steers, Heifers and Bulls As Influenced By Source, Post-Mortem Aging and Carcass Characteristics" *Journal of Food Science*, Vol 36, 1971, pp. 619-623. Tuma, et al, *Op. Cit.*, Walter, et al, *Op. Cit.*

[2] Berg, R.I., "Lean Fat or Bone in Beef Cattle." Paper presented at the 11th Stockmans School, San Antonio, Texas, January, 1974. Cole, H.H. (Ed.), *Introduction to Livestock Production*, W.H. Freeman and Company, San Francisco, 1966.

animals between twelve and thirty-eight months old and discovered no relationship between animal maturity and tenderness.[1] Studies have also concluded that tenderness is not correlated with the amount of visible marbling in the meat.[2]

Shear force, the amount of pressure needed by a shear to cut through a piece of meat, is one means commonly used to supplement taste panels and consumer surveys in evaluating tenderness. Studies have shown that shear force tests and subjective tests tend to be in agreement.[3]

A physiological factor in determining tenderness is believed to involve the relative amounts of connective tissue in the meat. That is, if the connective tissue to muscle fibre thickness ratio is relatively higher, the meat tends to be less tender. This is illustrated over the entire carcass where cuts such as a chuck tend to be less tender than a loin from that same carcass. Yeates concludes that there is not any direct relation between the size of muscle fibre and tenderness but, rather, if the fibre thickness multiplies, the lean to connective tissue ratio increases

---

[1] Norris, Helen L., Harrison, Dorothy L., Anderson, Lois L., Van Welck, Bettina, Tuma, Harold J., "Effects of Physiological Maturity of Beef and Marbling of Rib Steaks on Eating Quality." Journal of Food Science, Vol 36, 1971, pp. 440-444.

[2] Ibid, Tama, et al, Op. Cit. Walter, et al, Op. Cit.

[3] Norris, et al, Op. Cit. Prost, E., Petczynska, E., Kotula, A.W., "Quality Characteristcs of Bovine Meat: Beef Tenderness in Relation to Individual Muscles, Age and Sex of Animals and Carcass Quality Grade." Journal of Animal Science, Walter, et al, Op. Cit.

and at any age of animal tenderness is enhanced.[1] However, it does not appear reasonable to anticipate the use of the fibre to connective tissue ratio as a predictive tool in assessing beef tenderness by the meat industry. A sample would have to be taken off each carcass and analyzed with assumption that this ratic would remain constant throughout different cuts on that carcass. Thus, age of animal appears to be the only option present at this time for industry to evaluate tenderness.

After slaughter, tenderness may be increased by aging the meat at temperatures of 1-3°C, although the effect of aging past the first three days after slaughter is reported to be minimal by Berg, while Martin, et al, argue that six days is sufficient.[2] Differences occurring from aging past the first three to six days only become noticeable when longer periods of 14-21 days are used.

Tenderness may also be enhanced with different physical and mechanical treatments on the beef carcass. Tenderness was increased 53.6 percent by suspension via the obtinators foramen, severence of the vertebrae in five locations, severence of the ligamentum nuchae and then attaching 68

---

[1] Yeates, Op. Cit.
[2] Berg, Op. Cit. Martin, Fradeen, Weiss, Op. Cit.

kilogram weights to the neck.[1] However, this method involves substantial changes in carcass shape which may cause problems for fabrication. A method suggested by the Smith study is to chill beef at 16°C for the first 16 hour post mortem period and then cool the carcass at 2°C.[2] This method of aging is linked with increases in tenderness and involves little extra effort and no irregularities of shape.

Artificial tenderizing methods have been developed which, through the use of either mechanical methods or chemical enzyme additives, increase the tenderness of beef. The mechanical process consists of a machine that presses the meat between two plates on which many needles are mounted. Papaya juice is generally used as the enzyme in the chemical process where the meat is soaked for a specified period of time.

Flavor

The flavor of the meat from a beef animal tends to intensify and tenderness tends to decrease as the age of the animal increases. That is, as the animal matures, the intensity of the flavor increases. Meat flavor does not appear to be affected by variables such as firmness, color,

---

[1] Smith, G.C., Arango, F.C., Carpenter, Z.L., "Effects of Physical and Mechanical Treatments On the Tenderness of Beef Longissimus." Journal of Food Science, Vol 36, 1971, pp. 445-449.

[2] Ibid

marbling, fat cover, animal breed, or animal sex.[1] It is generally believed that flavor is derived from the meat juices, not the fat or meat fibre, although fat does contribute a fat flavor to the overall taste and can taint the meat flavor if spoiled.[2] Flavor cannot be objectively rated and thus consumers depend upon exogenous factors such as sense of smell and eating habits to determine preferences. It follows that these exogenous factors are difficult to measure or, indeed, even identify.

Juiciness

Juiciness of meat is derived from at least three sources: water content of the meat, intra-muscular fat and inter-muscular fat, but the literature has discussed little conclusive evidence as to which is more or less important. Often press fluid measurements are taken as an objective test. Taste panels and consumer surveys also are used to rate post-preparation juiciness. Walter, et al, reported that juiciness was not affected by animal maturity or marbling, a point substantiated by Tuma, et al.[3] Berg argues that not much marbling is necessary and that it need not be visibly recognizable to be sufficient to ensure juiciness.[4] More important factors in the juiciness of beef as perceived

---

[1] Berg, Op. Cit. Cole, Op. Cit., Yeates, Op. Cit.

[2] Hawrysh, Berg, Howes, Op. Cit. Norris, et al, Op. Cit. Walter, et al, Op. Cit. Yeates, Op. Cit.

[3] Walter, et al, Op. Cit. Tuma, et al, Op. Cit.

[4] Berg, Op. Cit.

by consumers could likely be cooking methods and salivation inside the consumers mouth.

Summary Statement

The above analysis indicates that eating quality is a subjective variable that can be determined only by appraisal after eating. One piece of scientific evidence that appears useful is the trade-off between flavor and tenderness: both flavor and toughness increase as the beef animal matures. Studies have not yet shown that factors such as texture, fat color, lean color, and marbling, which are used as quality indicators in the Canadian grading system, are accurate signals of eatability or that they are discernable after the meat is prepared.

Cutability

The term cutability in beef grading refers to the relative amounts of bone, lean, and waste on the beef animal. Assuming that a suitable combination of flavor, tenderness, and juiciness has been attained, the more desirable carcass would be one with a high proportion of lean meat tc bone, with fat optimized. That is, it is desirable to obtain the maximum lean yield and minimize waste. Excess fat is trimmed off and represents a loss in terms of wasted feed and man-hours.

Each breed of beef animal has its own fattening

pattern; some may fatten at young ages, others at more mature ages. An optimal time for slaughter may be determined on the basis of fat levels on the animal. Therefore cutability may be enhanced by the time at which a producer decides to market his animals.

Cutability may be affected in at least three ways other than breed selection: first, the time the animal is taken off of feed may be varied by the producer in order to regulate fat levels; second, the actual composition and type of feed may be varied to affect fattening patterns; and third, there are differences between the fattening patterns of steers, heifers, and young bulls that can be used to determine the optimal time to market beef animals.

The Canadian beef grading system measures cutability through the use of three separate standards. The external fat cover on the longissimus dorsi muscle (ribeye muscle) is measured between the eleventh and twelfth ribs and provides an accurate estimate of the overall fat cover. Supplementary measures include fitting the carcass into weight classes (warm carcass weights are used) and visual inspection for marked muscle or fat deficiencies.

CHAPTER III

THE MARKETING SYSTEM AND MARKET CHANNELS FOR ALBERTA BEEF

Introduction

The marketing system for beef originating with cattle sales and terminating with the final sale of fresh beef products to the consumer, encompasses a complex array of marketing channels. Often it is difficult to affix actual quantities representing the size and volume of the flows in a flow diagram because data are not readily available. Figure 3-1 illustrates a diagram of principle distribution flows for a livestock and meat system beginning at the producer and ending at the consumer. This is, however, a conceptual model and some flows may be negligible or non-existent within the Alberta market or regions of the Alberta market. Furthermore, the dynamic nature of a marketing system in real life leads to changing size of flows and services so that value - added by each functional level rarely remain static. The distribution channels may also appear or disappear depending upon industry trends at that time.

The immediate purpose of this chapter is to describe qualitatively and, where possible, quantitively, the marketing system for livestock and beef within Canada with special reference to Alberta. At the consumer end of the

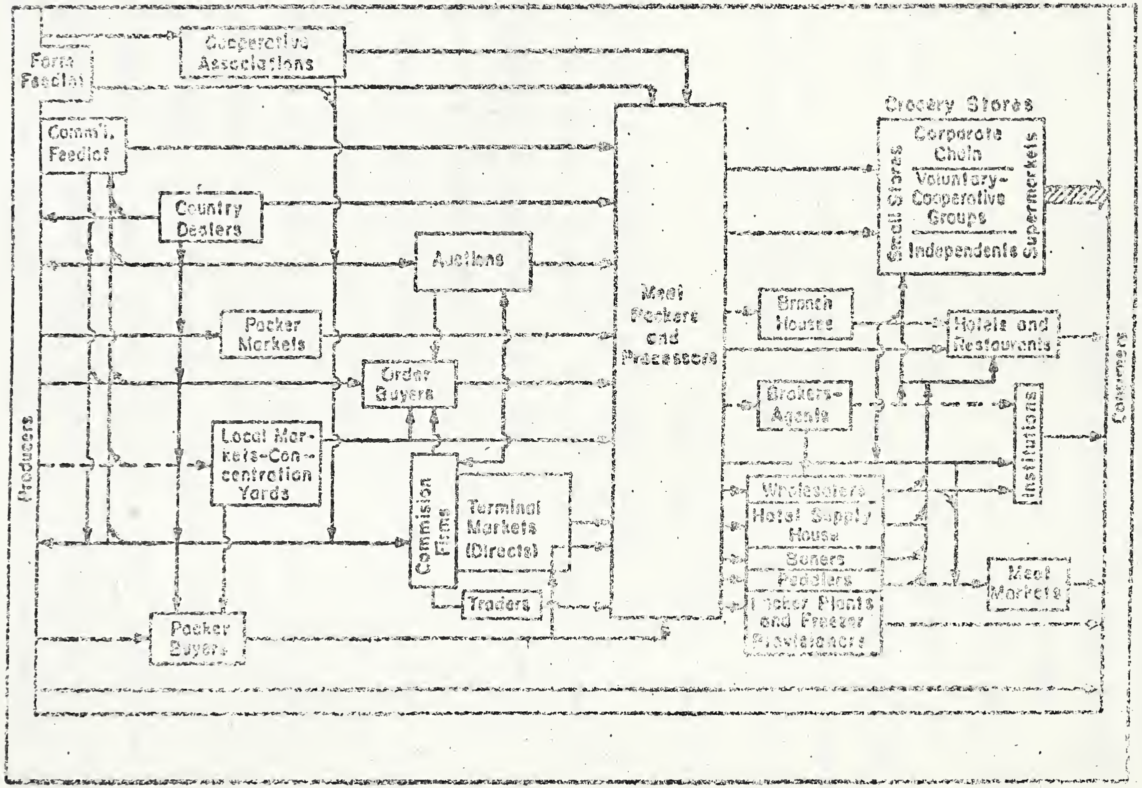
chain particular reference will be directed toward the food service industry rather than retail food store outlets which have been studied more extensively by other authors. Retail food stores receive considerable academic attention because they account for about 70 percent of the sales for Canadian consumption of fresh, frozen, or manufactured beef while the food service industry accounts for the remaining 30 percent.[1] The amounts of beef sold by specialty shops and butchers is small over the national total but may be important within individual regions.

---

[1] Report of the Commission of Inquiry Into The Marketing of Beef and Veal, Printing and Publishing Supply And Services Canada, Ottawa, Catalogue No. CP 32-22, 1976.

Figure 3-1

Marketing Channels



Source: Williams, W.F., Stout, T.T., *Economics of the Livestock-Meat Industry.*

Beef Production

Canada is a major producer of beef but since 1969 imports, primarily from Australia and New Zealand, have become a larger part of Canadian consumption. Currently, Canada is a net importer of beef. This beef is predominently frozen boneless beef and veal to be used for manufacturing purposes by Canadian packers.[1] This can be contrasted with the bulk of Canadian production which is directed primarily towards producing fed steer and heifer beef. From Table 3-1, in 1975, 33.5 percent of Canadian beef carcasses graded in federally and provincially inspected packing plants, graded A1; 24.2 percent graded A2; 5.4 percent graded A3; and 1.1 percent graded A4, so that 64 percent of Canadian beef cattle marketings were in the A grades. Furthermore, the provincial totals show over 72 percent of Alberta's kill were A-graded during that year.

The beef system begins with cow-calf operations which are predominantly located in Western Canada. Calving occurs in the spring and, on average, at the age of six months calves are weaned from the herd. At this point females are selected for breeding stock with the remaining calf crop (steers, remaining heifers, virgin bulls), plus cows and bulls culled from the cattle stock, being now directed to beef production. Some younger beef animals are killed as calves for veal but the rest are finished via feedlots,

---

[1] Beef imports are discussed more extensively in Chapter IV.

backgrounded or grass fed. The culled cows and bulls may be fed for a short period of time in order to make them more commercially acceptable.

One input into the beef cattle system is the number of dairy-type steers and heifers that are not to be used for herd replacement purposes. Thus these animals also enter the beef system.

TABLE 3-1a

Beef Carcasses Graded In Canada

By Province - Number, 1975

	Graded in:								
	BR. COLUMBIA COLOMBIE-BR.	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO	QUEBEC	ATLANTIC PROV. PROV. ATLANTIQUE	1975 TOTAL	1974 TOTAL
Grade A1	14843	465378	48435	159722	443058	12673	10010	1150119	974514
2	13745	389674	37271	120739	255279	13460	2705	831853	795303
3	2918	106941	7076	24240	42284	1823	493	185676	223651
4	283	22364	1134	4512	8679	370	62	37404	62110
B1	6799	42893	10811	25309	56028	2655	5771	151086	151247
2	240	1146	533	2333	1215	139	25	5539	6240
3	8	191	43	236	47	23	2	549	734
4	7	99	14	48	15	12	1	196	235
C1	10040	56357	10555	26783	61632	5033	6331	179541	136407
2	2392	6264	2049	4009	14859	6193	4250	40022	29960
D1	1795	71470	8207	29387	21851	7056	1406	141233	103679
2	3820	50559	12041	34769	20324	12201	3435	143159	113513
3	9516	37904	9109	16926	29454	25701	4763	110063	102383
4	5312	85622	16887	66311	87542	100991	10209	372773	275008
E	2223	15037	4194	7321	16534	16023	1204	62536	51696
TOTAL 1975	73858	1359289	168359	807721	1056202	205224	52347	[illegible]	
1974	57583	1135707	271079	455489	1021464	165737	37325		3044668
IMPORTS 75	462	2573	100	6462	22298	-	-	41895	
74	120	4594	416	15265	86763	3049	-		109207
DOMESTIC 75	73396	1356716	168259	801259	1034503	205224	52347	3392334	
74	57463	1131113	270663	440224	934701	162688	37639		2935461

Source: Livestock Market Review 1975

TABLE - 1b

Beef Carcasses Graded In Canada

By Province - Percentages, 1975

		Graded in:								
		BR.COLUMBIA COLOMBIE-BR.	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO	QUEBEC	ATLANTIC PROV. PROV.ATLANTIQUE	1975 T O T A L	1974
Grade	A1	20.1	34.2	28.8	30.7	41.3	6.2	18.9	33.3	32.0
	2	18.6	28.7	32.1	33.8	33.9	6.1	5.2	24.2	26.1
	3	3.9	7.9	4.2	4.8	4.0	0.9	0.9	5.4	7.3
	4	0.4	1.6	0.7	0.9	0.8	0.2	0.1	1.1	2.0
	B1	9.2	3.3	6.4	2.1	5.1	1.8	10.9	4.4	5.0
	2	0.3	0.1	0.3	0.4	0.1	0.1	-	0.2	0.2
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
	C1	13.6	4.1	6.3	5.3	5.3	2.8	15.7	5.2	4.5
	2	3.2	0.5	1.2	0.9	1.4	3.0	8.2	1.2	1.0
	D1	2.4	5.1	4.9	5.6	2.0	3.4	2.8	4.3	3.4
	2	5.2	4.3	7.2	4.9	2.7	8.9	6.5	4.2	3.7
	3	13.9	2.7	5.4	3.9	2.8	13.6	9.0	3.8	3.4
	4	7.3	0.3	10.0	13.0	0.2	49.2	19.3	10.9	9.0
	E	3.0	1.3	2.5	1.4	1.0	1.8	2.5	1.3	1.6

Source: Livestock Market Review 1975

TABLE 3-2

Numbers of Beef and Dairy Cattle on Farms
1961,1971,1974
(thousand head)

	Beef				Dairy			
	West	Ont	Que	Other	West	Ont	Que	Other
1961	1,921.4	318.7	70.5	27.4	816.8	992.4	1,006.7	170.9
1971	2,866.4	434.7	164.0	49.2	487.5	755.3	906.3	105.9
1974	3,478.0	500.0	220.0	57.5	437.0	620.2	930.0	93.0

Source: _Report of the Commission of Enquiry Into The Marketing of Beef and Veal_. Printing and Publishing, Supply and Services Canada, Ottawa, Catalogue no. CP 32-22, 1976.

TABLE 3-3

Inspected Beef Slaughter

1961-1974

(In Percentages)

	Alta	Man	Ont	Que	Sask	BC	Maritimes
1961	22.1	17.6	28.7	21.1	4.9	3.9	1.7
1970	33.1	15.6	33.2	6.1	5.7	2.3	1.2
1971	36.5	15.3	32.8	7.1	5.6	1.4	1.3
1972	38.6	15.1	32.1	5.7	5.9	1.1	1.3
1973	38.6	15.1	32.3	5.8	5.6	1.2	1.3
1974	38	15	34	5	6	2	1
1975	40.5	15.2	30.5	6.1	5.0	1.0	1.5

Sources: Livestock Market Review

Report of the Commission of Inquiry Into The Marketing of Beef and Veal. Printing and Publishing, Supply and Services Canada, Ottawa, Catalogue no. CP 32-22, 1976.

International marketings also affect the Canadian beef system. Canadian exports to the U.S. consist largely of feeder cattle and manufacturing type beef. Imports from the U.S. are thought to consist largely of high quality beef cuts for the HRI trade.

Table 3-2 indicates the number of beef and dairy cattle on farms in Canada, showing changes and reallocations over time. Table 3-3 lists inspected slaughter for 1961 and 1970 through 1975 by region.

Canadian beef producers contend with a long run source of price fluctuation in what is termed the "beef cycle." This refers to a cycle in beef production with a corresponding and opposite price cycle. Evidence as to the length and amplitude of the cycle tends to vary because each cycle has been different from previous ones. However, the cycle is generally believed to have ranged from eight to eighteenyears in length.[1]

Briefly, an explanation for the existence of cycles is similar to the following. Relatively high prices for cattle will encourage feedlots to expand production. The high prices also, in turn, encourage cow calf producers to hold animals from market in order to expand production and accrue higher earnings. The biolcgical nature of cattle production creates a three to four years lag before increased

---

[1] Report of the Commission of Inquiry Into The Marketing of Beef and Veal, Op. Cit.

production efforts of cow-calf operators begin to seriously affect market prices. Beef cattle marketings begin to increase, driving down prices. The lower prices act to discourage producers who then market more animals in an effort to reduce herd sizes, further depressing prices. As the herd size falls, beef cattle marketings begin to fall, buoying prices and perpetuating the cycle.

The long term price fluctuations are complicated by a seasonal source of short-term price fluctuation. Prices for slaughter cattle are traditionally highest from February to July because the low slaughter months usually are between February and April.[1] Conversly, prices have generally been lower during the August to January period when cattle marketings are higher.[2]

Live Animal Marketings

Three main market channel alternatives are used by beef producers and feedlot operators to market their cattle. Direct sales to packers constitute the largest channel accounting for 55 percent of sales, while terminal markets contribute 30 percent and country auctions 15 percent.[3] Calves and feeder cattle are usually sold through the

---

[1] *Ibid*, p. 14
[2] *Ibid*, p. 14
[3] Haney, Harry D., "Feeder Cattle Marketing in Southern ALberta." Unpublished M.Sc. Thesis, Department of Rural Economy, The University of Alberta, Edmonton, 1974. *Report of the Commission of Inquiry Into the Marketing of Beef and Veal*, *Op. Cit*.

auction system.

Direct-to-packer sales may be done in a variety of ways. Selling rail grade has become a popular method and one unofficial industry source indicated that it will continue to grow in importance. Briefly, rail grading means delivering beef animals to slaughter and receiving payment based upon the carcass grades received. Other methods of direct-to-packers selling include sealed bid sales and private auction sales.

The use of terminal markets as a channel has been a declining portion of cattle marketings. The other two cattle marketing methods have largely replaced this system. Haney reported that most fed cattle rerouted from terminal markets in Alberta were being sold direct to packers, while rerouted feeder cattle were being sold through auction markets.[1] This trend may be representative of changes in other regions of Canada. Terminal market use in recent years has declined largely due to at least three reasons:[2]

1. Marketing costs are relatively high, losses from handling tend to be greater than direct sales to packers.
2. Fixed operating costs are high while daily throughput volumes vary greatly.
3. Their locations are not generally desirable or

---

[1] Haney, Op. Cit., p. 86

[2] Report of the Commission of Inquiry Into the Marketing of Beef and Veal. Op. Cit., pp. 18-19.

accessible.

Country auctions have shown recent growth but are regionally popular, with the greatest use in Southern Alberta.

Beef Processing

Slaughtering and Packing

The beef packing industry may be divided into two distinct groups; major packers including Swifts, Canada Packers, Burns, and Intercontinental Packers, and the independents of which there are many one-plant firms. The Commission of Inquiry into the Marketing of Beef and Veal reported that the four major packers have accounted for over 50 percent of the federally inspected slaughter since 1960 and particularly dominated the slaughter in the prairie provinces in the following manner:[1]

74 percent of Alberta's kill
92 percent of Saskatchewan's kill, and
78 percent of Manitoba's kill

If these estimates are accurate it would appear that the major packing firms percentage of national beef slaughter has fallen since 1959 when the major firm slaughter was estimated at 60-65 percent of the total kill.[2] It should be

---

[1] Ibid, p. 20.

[2] Restrictive Trade Practice Commission, Report concerning The Meat Packing Industry and the Acquistion of Wilsit Limited and Calgary Packers Limited by Canada Packers Limited, Department of Justice, Ottawa, 1961.

noted that the major firm group in 1959 included only Burns, Swifts and Canada Packers.

Slaughtering and manufacturing of beef remain the primary function of the beef portion of the packing industry although there has been limited development in recent years of breaking and portion cutting facilities. The Commission of Inquiry into the Marketing of Beef and Veal reported the 1974 breakdown of beef sales to be the following:

76 percent in carcass form
18.8 percent in primal cuts, and
4.8 percent in portion controlled cuts for the HRI trade.

Table 3-4 outlines the result of interviews with two major packers in Edmonton during the spring of 1976. These results appear to be roughly comparable with those of the Commission's, although enough discrepancy exists to require an explanation.

One explanation might be that there are regional differences in activities carried on by packing houses across Canada that are hidden in aggregating data. Alberta packing plants supply a portion of the beef market in Montreal and transportation costs might necessitate increased breaking facilities. However, less breaking facilities in other regions might serve to reduce the overall percent of beef that is broken into primal cuts.

Another possibility is that there have been structural

changes since 1974 in the packing industry and firms are increasingly breaking beef into primal and portion controlled cuts.

TABLE 3-4

Breakdown of Beef Sales By Edmonton Packers

(In Percentages)

1976

Firm	Left in Carcass Form	Broken-Primal Cuts	Broken Portion Cut	Total
Packer A	66	23	11	100
Packer B	74	22	4	100

TABLE 3-5

Geographical Source of Beef Procurred By Edmonton Packers

(In Percentages)

1976

Packer	Alberta	Other part of Canada, U.S.	N.Z./Australia	Total
Packer A	96.5		3.5	100
Packer B	98	2		100

Breaking beef into primal cuts and boxing it for shipment help reduce transport costs in a number of ways. Excess waste in trimmed fat and bone is removed reducing freight charges for materials not used in production. This provides one form of saving. Another is that room can be used more effectively by stacking boxes as opposed to hanging carcasses, thus the carrying capacity of different forms of transport is intensified.

Industry sources have indicated that the development of breaking and boxing beef at the packer level in Canada is limited in a number of ways by opposing forces. In order for a packer to profitably break beef he must have markets for all cuts. The middle cuts such as loins and ribs generally go to the HRI trade while end cuts (chucks and hips) are predominantly sold through retail food stores. A problem that has evidently risen periodically in Canada is that a surplus of the end cuts develops and price reductions must be used to reduce excess supply. Losses are then made up in higher prices on the middle cuts. This system thus leads to instability and higher prices for restaurant purchasers. Seasonal fluctuations in the demand for beef intensifies this problem to restaurants. The summer bar-be-que season leads to more middle cuts being sent to retail food stores and a fall in the sales of end cuts. Thus, prices for loins and ribs during the summer months face upward pressure from two sources: increased demand for middle cuts by retail food stores, and decreased demand for end cuts, leading to

packers charging higher prices for the middle cuts.

The establishment of a fully integrated breaking facility by a major retail food chain in Alberta has helped to limit the development of boxed beef services from Alberta packing plants. This retail chain is the largest in Alberta and thus reduces the potential demand for boxed beef.

Table 3-5 indicates the geographical source of beef purchased by the two packing firms in terms of beef originating in Alberta, other parts of Canada, the United States, and Oceanic Countries (Australia and New Zealand). At the time of the study, packers in Edmonton were purchasing almost all their beef in Alberta with the use of imported beef being limited to manufacturing beef and beef for the HRI trade.

The packers both felt that price was the singular greatest factor in their purchase decision. As long as the Alberta prices were in line with Canadian prices, which were, in turn, in line with world prices, there would be little inflow of foreign beef into Alberta. It was also indicated by packers that the price factor becomes more important over the long run because the Canadian market is prone to price and supply fluctuations which, on occassion, tend to give the competitive edge to foreign beef.[1]

---

[1] This question is investigated in more detail in Chapter IV.

Packers Beef Purchasing Patterns

Beef packers provide a variety of functions but are primarily engaged in buying beef animals, slaughtering and dressing the animals, and preparing the meat to the form specified by customers. Ideally, packers should know what features are regarded as quality by their customers so they may purchase and prepare the beef animal to meet these specifications. The following section outlines some of the more salient features that arose during discussions with packers and purveyors on this topic.

The sex of the animals appeared not to matter in the purchase decision of the packer, especially when the beef was to go to the HRI trade, either directly or indirectly through purveyors. Purveyors and restaurants purchase beef almost entirely in primal and portion cuts and therefore it is not possible to determine the sex of the animal. Closely related, however, is the question of carcass weight. When marketed at the same age, heifers tend to be lighter than steers and hence sex might be an indirect factor depending on whether heavier or lighter carcasses are being demanded. For example, if a small ribeye is in demand by the food service industry, it may be advantageous to shift purchases to heifers and conversely, demand for larger loins and ribs could make steers more suitable. Heifers also tend to fatten at less mature ages so that fat level of the beef could be a factor.

When questioned about imported beef results of the interviews tended to be varied and unclear. However, geographical source was an important factor to some firms. New Zealand beef was preferred over Australian beef for the HRI trade by several packers and purveyors. It was hypothesized by these suppliers that there were fat content differences between beef from the two countries (New Zealand beef was believed to be leaner) while the other packer and purveyor preceived no appreciable difference.

Packers agreed that price was the dominant reason for importing foreign beef. It was felt that if a competitor was importing beef at lower prices, failure to react in a similar manner would result in being forced out of the market. One packer indicated that, as a secondary factor, often Canada didn't have a consistent supply of similar beef and it was necessary to go into the international market to ensure a supply. No other factors stood out as dominant in the foreign beef purchase decision of the packers.

Beef Processing by Packers

With fed cattle, packers are primarily engaged in the slaughter and preparation of beef carcasses for their sale to retail food stores. The breaking of A graded carcasses into primal and portion cuts is of secondary importance to packers, largely because the major Albertan retail store outlet specifies carcasses. The two packers interviewed displayed roughly similar patterns of what percentage of

each A grade were broken into primal cuts. Table 3-6 summarizes these results.

TABLE 3-6

Percentage of Grade Broken into Primal Cuts

(In Percentages)

1976

Packer	A1	A2	A3	A4
Packer A	20-25	20-25	95	95
Packer B	22	——	95	95
Carcass Sales	75-80	75-80	5	5
Total	100	100	100	100

The graded kill totals of the packers roughly followed those of the 1975 Livestock Market Review (Table 3-1b). Virtually all A3 and A4 carcasses are broken into primal or portion cuts for sale to the HRI trade either directly or indirectly through purveyors. Several reasons were given as to why A1 and A2 carcasses were left unbroken.

The first reason relates to retail food chain specifications. It was indicated by packers that retail food chains rarely would accept A3 and A4 carcasses because they had excess fat that required trimming. Thus the HRI trade and purveyors received carcasses unacceptable to the retail meat trade plus A1 and A2 carcasses in surplus of retail demand. A second reason, related to the first, is that the trimming of excess fat on A3 and A4 carcasses could be more economically accomplished by having it done during the breaking operation.

These figures, acquired during the course of the interviews, were received in an informal manner, that is, official yearly records were not examined, but rather, the records of that week's cross section of grades was used as an indicator of the regular cross-sectional breakdowns. These may or may not be representative. It was believed by firm officials that they were indicative of the normal situation. Thus, it would indicate that at least two plants in Edmonton leave less of their beef sales in carcass form with Packer A breaking more of its beef (34%) than Packer B (26%) into primal and portion controlled cuts.

Purveying

Purveyors are a specialized part of the beef marketing system, dealing nearly entirely in restaurant supply. They provide a number of services to the food service industry including quality determination, storage, processing and distribution.

Processing has particularly become more important in recent years because the food service industry is demanding larger amounts of uniform beef cuts. Restaurants have also tended to specialize, limiting the variety of beef cuts required. Purveyors process primal cuts into portion controlled cuts according to the specifications of individual hotels, restaurants and institutions. Ground beef patties are also produced to individual lean, fat and additive specifications.

Purveyors partially determine beef quality although restaurants will usually specify the grade required. Quality determination at the purveying level occurs because the actual purchasing of beef is done at the purveyors discression.

The storage function implies two elements. One is the storage of beef for delivery at predetermined times because restaurants do not tend to have large storage facilities. The storage function includes, as a sub-function, aging to a restaurants specifications.

Part of the recent growth in the HRI trade can be attributed to the development of high volume specialty outlets. This factor has contributed to the development of purveyors through their ability to purchase beef in large quantities and distribute individual cuts to different segments of the HRI trade. Thus allocation and distribution of separate cuts are functions carried out at the purveying level.

The growth of the size and number of purveyors has been a recent phenonmenon stimulated by need of restaurants for a consistent supply of portion and quality controlled meat. Packing plants were primarily oriented towards supplying the retail supermarket trade with carcass beef and until the recent growth of the demand for food away from home, supplying the food service industry was generally subsidiary to the interest of the packers. Both packers interviewed testified that they did not have the facilities to properly and profitably supply restaurants and that it was a speciality business better suited to purveyors.

Interviews were conducted with three Edmonton purveyors. They were questioned as to the specifications of beef procured and the geographical source of that beef. Table 3-7 summarizes the results.

Alberta beef was almost entirely being used by purveyors at the time of the interviews. Some boneless manufacturing beef from the Oceanic Countries was imported

and primarily used for ground beef patties, although Purveyor B did offer an economy cut steak from foreign beef. Little American beef was entering the Alberta market at that time.

TABLE 3-7

Form of Beef Procured by Purveyors

(In Percentages)

1976

	Alberta Beef		Other Parts of Canada			
	Primal Cuts	Carcass Halves, Quarters	Primal Cuts	Carcass Halves, Quarters	Foreign Beef	Total
Purveyor A	80	--	--	10	10 (Aust)	100
Purveyor B	80	--	--	--	20 (Aust N.Z.)	100
Purveyor C	20	80	--	--	--	100

TABLE 3-8

Institutional Source of Beef to Purveyors

(In Percentages)

1976

	National Packer	Regional Packer	Wholesale Distributor	Brokers	Total
Purveyor A	25	65	--	10	100
Purveyor B	70	10	--	20	100
Purveyor C	25	75	--	--	100

TABLE 3-9

Average Warm Weights for Inspected Slaughter in Alberta - 1975

	Pounds
January	554.4
February	563.9
March	579.9
April	581.2
May	565.6
June	560.6
July	549.6
August	547.7
September	556.7
October	550.6
November	540.8
December	538.2

Source: Agriculture Canada, _Livestock Market Review_, Markets Information Section, Livestock Division, 1975.

TABLE 3-10

Beef Breaking Activities of Purveyors

(In Percentages)

1976

		Primary Source	Breaking Activities		
		Primal or Carcass	Primal Cut	Portion Cut	Hamburger Patties
Purveyor A	Primal	80	-	70	10
	Carcass	10	10	-	-
	Foreign Frozen	10	-	-	10
		100			
Purveyor B	Primal	80	10	60	10
	Foreign Frozen	20	-	-	20
		100			
Purveyor C	Primal	20	10	10	-
	Carcass	80	10	50	20
		100			

The national packers do not supply beef to purveyors in quantities representative of their respective portions of Alberta's slaughter. Conversely, regional packers supply a larger portion of beef to purveyors than their slaughter share would indicate. Table 3-8 summarizes the institutional sources of beef to purveyors in Edmonton.

Brokers are firms specializing in the procurement and distribution of beef from distant sources. They generally do not process meat. Brokers tend to specialize in importing foreign beef; it is through these sources that imported beef is aquired.

Beef Quality Factors

Purveyors expressed opinions similar to those of packers with respect to quality characteristics of beef. Two of three purveyors agreed that the sex of carcass was not an important factor while the third felt that steers were more suitable for the HRI trade because heavier loins and ribs were being demanded. However, this difference dissolved when the topic of carcass weight was brought up. All three agreed that the average carcass weight of beef designated for restaurants was between 500 and 600 pounds. The average warm weights for Alberta cattle in 1975 ranged between 538.2 and 581.2 pounds per carcass as shown in Table 3-9.

This finding is not compatible with the work of Smith, et al, who concluded that ribs and loins to fit HRI

specifications must come from carcasses weighing in excess of 700 pounds.[1] Lighter carcasses and their resultant primal cuts are in demand likely because of two reasons. First, inflationary pressure has pushed operating costs up so one cost reducing measure is to decrease the portion size, but keep the impression of a large steak by offering a cut that is small in diameter but relatively thick. Secondly, a chef can control the preparation of a steak better if it is thick. A thin steak can be either rare or well done with little room for in-between tastes. A steak cut from a heavy loin will likely have a portion size too large for present consumer tastes if it were to be thick enough for controlled cooking.

Only two purveyors, A and B, were importing beef at the time of the interviews. Agreement was close between them on the importance of different factors when importing beef. Price was the leading factor reported although importance was also attached to the following factors: leanness, consistent supply, uniformity of product, and quality.

Purveyors function almost entirely as restaurant suppliers and exist primarily because of the need for firms specializing in producing portion controlled cuts. Hence almost all processing done by purveyors is breaking primal cuts and carcasses into portion controlled cuts or grinding beef for the production of ready-made hamburger patties.

---

[1] Smith, et al, Op. Cit.

Table 3-10 summarizes the breaking activities of purveyors.

Artificial tenderizing either mechanically or chemically was not found to be widespread among packers and purveyors although it was done on special request by two purveyors. Purveyor B tenderizes mechanically and Purveyor C uses an enzyme tenderizer if requested, on cow beef.

CHAPTER IV

AN ANALYSIS OF THE EFFECT OF BEEF IMPORTS ON THE CANADIAN CATTLE ECONOMY

The Problem

Beef is not a homogeneous product. Canada tends to specialize in the production of quality fed beef directed primarily to the retail meat trade and secondarily to the food service industry. Beef originating from the Oceanic Countries, on the other hand, tends to be boneless beef, frozen and boxed, intended for the manufactured beef market.[1] Thus a large amount of the imported beef is similar to meat from beef carcasses which correspond to the C., D., and E. grades in Canada. These grades accounted for 31.2% of the total cattle marketings for slaughter at federally inspected packing plants in 1975.[2] The problem therefore is twofold: to determine whether selected variables influence the quantity of beef imported from Australia and New Zealand; and secondly, to investigate the impact imported beef's price and quantity have on Canadian cattle prices.

Objectives

It is hoped that one result of this chapter will be an institutional and statistical understanding of some of the

---

[1] Oceanic beef is beef from Australia and New Zealand.
[2] Agriculture Canada, Livestock Market Review, 1975.

intricacies of the demand side of beef imports. It would also appear useful to gain an understanding of the effect selected economic variables have on the quantity of beef imported.

More specifically, the major objectives of this chapter are:

1. To determine and measure the responsiveness of the quantity of beef imports from New Zealand and Australia to relative changes in the price of cattle in Canada, the number of Canadian cattle marketings, and the prices of substitute meats.

2. To develop an explanation of the historical and present situation with respect to the variables listed above along with institutional factors and to provide a tool that will help with prediction of the future trends in beef imports.

3. To determine the effect changes in oceanic beef prices and the quantity imported have on Canadian cattle prices.

Rationale and Scope

In general terms, Canada is a major agricultural trading nation. Although the actual quantities of commodities traded by Canada are not a large portion of world production, they nevertheless can play a direct role in the price determination of some products produced by

Canadian farm operators. Cattle sold for beef is one such product. Table 4-1 highlights Canada's trade totals over ten years.

TABLE 4-1

Canada's Trade In Agricultural Products

1966-1975

	Agricultural Trade			Agricultural Trade (As a Percentage of Total Merchandise Trade)	
	Exports	Imports	Balance $ (Million)	Exports %	Imports %
1966	1,862	1,036	826	18.5	10.5
1967	1,483	1,084	399	13.3	9.8
1968	1,395	1,095	300	10.5	8.9
1969	1,211	1,246	-35	8.3	8.8
1970	1,685	1,283	402	10.2	9.2
1971	1,993	1,299	694	11.4	8.3
1972	2,135	1,538	597	10.8	8.2
1973	3,004	2,163	841	12.2	9.3
1974	3,830	2,828	1,002	12.2	9.0
1975	3,916	2,891	1,025	12.2	8.4

Source: Agriculture Canada, _Selected Agricultural Statistics for Canada_; Pub. No. 76/10, C.D.A., Ottawa.

Canadian cattle prices often face two distinct forces. One is a North American fed cattle market in which price determination is dominated by the United States.[1] Whenever Canadian prices fall seriously out of line with prices in the United States fed cattle tend to enter Canada equalizing Canadian and American prices, plus the costs of transport and tariffs. Similarly, the reverse will occur if U.S. prices are higher. Canadian exports to the United States normally consist of two types: trans-shipments of Oceanic beef and shipments of fed cattle.[2] Imports from the United States are generally thought to consist of high quality cuts destined for the HRI trade.[3]

A second force affecting Canadian cattle prices would appear to be world market prices for manufacturing beef in which Australian and New Zealand beef tend to dominate. Thus, the North American manufacturing beef market operates within a world beef economy.[4] The extent to which Oceanic beef affects Canadian cattle prices relates to the final use of different types of cattle. It would appear that fed cattle prices would be influenced to a lesser extent than cattle corresponding to the D grades.

Relatively little beef except prepared forms such as pickled, cured, cooked or corned beef enters Canada from

---

[1] Marshall, R.G., Beef and Pork In Canada: demand, supply and trade, Paper to the Food Price Review Board, June, 1974.
[2] Ibid.
[3] Ibid.
[4] Ibid. p. 47

major beef producing countries other than the United States, Australia and New Zealand. A major reason stems from a Canadian foot and mouth disease regulation that does not allow fresh or frozen unprepared beef to enter Canada from countries where hoof and mouth disease is considered serious.[1]

Table 4-2 summarizes Canadian imports of beef and veal, fresh, chilled or frozen from Australia and New Zealand since 1968. It should be noted that included within Table 4-2 are quantities of beef imported and subsequently exported to the United States.

---

[1] Ibid

TABLE 4-2

Imports of
Beef and Veal
Fresh, Chilled or Frozen
Boneless (cwt)
1968-1976

Year	Total Beef and Veal	Australia	New Zealand	Total Australia and New Zealand
1968	209,679	108,718	64,288	173,006
1969	1,085,837	293,876	748,034	1,041,910
1970	1,344,433	551,907	734,287	1,286,194
1971	1,034,650	247,590	611,698	859,288
1972	1,331,971	584,482	477,666	1,062,148
1973	1,494,241	663,943	482,674	1,146,617
1974	1,182,261	459,265	547,355	1,106,620
1975	1,285,905	636,002	539,226	1,175,228
1976*	993,227	361,638	486,218	847,856

*Jan-June

Source: Statistics Canada: Imports by Commodities, Catalogue 65-007, Monthly.

It is not exactly clear why the overall trend has been toward increasing beef imports. Marshall argues that the influx of imports from Australia and New Zealand is a result of deficient domestic manufacturing beef supplies.[1] His study asserts that on the demand side there has been an expanding market for ground beef and beef for processed meat products while on the supply side there has been declining cow slaughter and a drop in marketings of poorly finished beef. The actions of cattle producers held cow slaughter down in the early 1970's when strong beef prices acted to encourage herd expansion.[2] This served to create a fall in cow slaughter which, in turn, provided an expanding market for Oceanic beef.

Less clear, however, was the recent situation which combined high levels of domestic cow slaughter with rapid increases in the quantity of beef imported.[3] This appears to indicate that other variables have been providing incentive to Oceanic exporters because prices in Canada were low and the quantity of manufacturing type cattle available for slaughter high. It does not appear likely that aggregate demand for cow beef has expanded so rapidly that increases in both the foreign and domestic beef supply could be readily absorbed under normal market conditions. It is hypothesized that some substitution of Oceanic beef for

---

[1] Ibid.
[2] Agriculture Canada, Op. Cit., p. 8.
[3] Ibid.

domestic beef has occurred.

TABLE 4-3

Number of Cattle in Australia (million head)

1968-1974

	Period	Number
March 31	1968	19.2
	1969	20.6
	1970	22.2
	1971	24.4
	1972	27.4
	1973	29.1
	1974	31.2

Source: Hawkins, M.H., McCormick, R., _The Australian Beef Industry: Report No. 10_., Unpublished report to the Alberta Government.

The nature of the Australian and New Zealand beef industries may provide a partial explanation of the size and growth of beef imports. The climate in both countries is such that cattle herds may be normally kept on pasture with little supplementary feeding on a year-round basis and breeding may be done twice a year.[1] This feature allows for low production costs and increases in cattle numbers if favorable market conditions persist. It is also possible to withhold cattle from market until the economic climate is more favorable. A large stock of cattle, low cost production, and the ability to rapidly increase herd sizes combine to partially explain why Oceanic beef can enter Canada in large quantities. Table 4-3 indicates the number of cattle in Australia, 1968-1974.

Beef production surpluses and the loss of a major portion of the Japanese and E.E.C. markets have combined to create a reservoir of beef, primarily in Australia but also in New Zealand. Both countries have been exporting beef at a broad range of prices into Canada in order to find markets for this beef, of which 30-40 percent is available for export.[2] Thus imports have increased from the Oceanic countries despite low prices for manufacturing type cattle in Canada at least partially because Australia and New Zealand are willing to export at virtually any price.

---

[1] Hawkins, M.H., McCormick, R., "The Australian Beef Industry: Report No. 10." Unpublished report to the Alberta Government.

[2] Ibid

The growth in the demand for food away from the home has likely played a role in expanding demand for lower priced beef, especially ground beef. The leanness of Australian and New Zealand beef makes it compatible for use as ground beef for hamburgers. One study indicates that ground beef has become the most popular type of meat consumed in the United States and accounts now for at least 40 percent of American beef consumption.[1]

Hamburger consumption has not been the sole variable expanding the demand for Oceanic beef. Cochrane, et al., report that Oceanic beef is also being used for manufactured meat products, medium quality boneless beef cuts sold in retail stores, medium quality beef sold at restaurants, New York sirloin strips sold in high quality restaurants and beef sold by caterers.[2]

A certain amount of beef has also likely been imported into Canada with the intention by importers of re-exporting it to the United States. In this manner more Australian and New Zealand beef has entered the U.S. than would normally be allowed in view of the American voluntary quota system that was in effect with Australia and New Zealand but exempted Canada. Thus for a portion of total Canadian beef imports,

---

[1] Fischer, Norman H., "Ground Beef Consumption Hits Records as U.S. Becomes a Hamburger Society," Wall Street Journal, October 18, 1976.

[2] Cochrane, I.S., Crowston, E., Johnson, A.S., "The Role and Implications of Oceanic Beef In The Canadian Beef System." Unpublished report, 1977.

Canada was being used as a vehicle of entry to the United States.

Oceanic beef arrives predominantly boneless and frozen. The beef may range over different animal types, varying in age, sex and breed. Boneless beef for export to North America must have 10 percent visual fat and 15 percent actual fat.[1] For actual fat ranges between 15-20 percent, a formula for price reduction is used and if greater than 20 percent the beef is returned to the seller.[2] In addition to boneless manufacturing meat, strip loins, tenderloins, top butts and bottom butts are entering Canada on occasion to be marketed by purveyors as economy priced cuts.

Oceanic beef is usually purchased by Canadian meat wholesalers and sold by phone to customers across Canada. The beef is shipped by sea and payment is made via sight draft transactions; the account is payable within two weeks of the ship landing. The meat cannot be handled or processed until it has passed federal inspection.

Over the time span of the statistical study, 1969 through 1975, Canada imported 4,627,158 c.w.t. of beef from New Zealand (almost 57 percent of total Oceanic supply) while Australia was the source of 3,437,065 c.w.t.

---

[1] Hawkins, McCormick, Op. Cit.
[2] Ibid.

(43 percent) of a total 8,064,223 c.w.t.[1] There is no attempt within this analysis to differentiate this beef into any sub-categories of quality or form. It is possible, for instance, that when price comparisons are being made between Australia and New Zealand the products at that time are not identical. This would occur if one country had happened to have proportionally more sales in higher quality meats than the other. Unofficial trade sources indicated that New Zealand beef was leaner than Australia's, often commanding a higher price. It was suggested that their firm would purchase New Zealand beef whenever possible in preference to Australian beef. Care must be taken, thus, in interpreting the results of the analysis because there is an implicit assumption of homogeneity of products.

Methodology

The nature of the problem requires the use of time series data which are, by necessity, secondary. These data will be divided into quarterly periods from 1969 to the end of 1975, providing twenty-eight observations. The trade totals will be the sum of the three months imports in each quarter and average price will be determined by dividing the trade total into the sum of values of beef imported for that period. The Canadian cattle price index is the weighted

---

[1] Oceanic beef here and elsewhere in this chapter refers to all beef and veal from Australia and New Zealand be it fresh or frozen, bone-in or boneless. See Table 42 for a yearly breakdown of imports.

average of D1 and D2 cattle prices.[1] D3 and D4 carcasses are more similar in quality to Oceanic beef and likely are the Canadian grades that are in direct competition. However, data problems necessitated the use of prices for D1 and D2 carcasses. A statistical regression run between D1 and D4 cattle prices yielded a multiple R^2 of 0.9 indicating that price movements were similar for both grades.

The price of hogs was calculated similarly.

The Model

It has been shown above that the demand for beef imports is a complex function which might possibly be quantified. Caution must be exercised however because it is possible that institutional factors such as economic export policies of the New Zealand Meat Export Development Company and the Australian Meat Board may periodically play important roles in determining the quantity of beef flowing into Canada. In light of these considerations the beef import demand has been established as follows:

$$IM = f\,(BPc,\ BPf,\ BM,\ PP) \qquad (1)$$

Where:

IM = Quantity of fresh, chilled, or frozen boned beef and veal imported from Australia and New

---

[1] The prices used for the years 1969-1972 were the average prices of Good Cows.

Zealand.

BPc = Weighted price of Canadian D1 and D2 cattle.

BPf = Price of Australian and New Zealand beef imported into Canada.

BM = The number of cattle marketed in Canada.

PP = The Canadian average price of hogs.

Table IV

BEEF IMPORTS--QUANTITY, VALUE, PRICE, PERCENT MARKET

1969-1975

	Australia			New Zealand			% of Total Sales	
Obser-vation	(cwt) Quantity	($000) Value	($/cwt) Price	(cwt) Quantity	($000) Value	($/cwt) Price	Australia	New Zealand
1	22,464	997	44.38	1,547	070	45.25	93.56	6.44
2	68,063	2,842	41.76	73,704	2,954	40.08	48.01	51.99
3	57,623	2,843	49.34	236,658	9,711	41.03	19.58	80.42
4	145,726	6,625	45.46	436,125	17,040	39.07	25.05	74.95
5	80,952	3,228	39.88	78,223	2,888	36.92	50.86	49.14
6	143,542	6,917	48.19	246,109	10,427	42.37	36.84	63.16
7	236,526	11,434	48.34	300,877	13,573	45.11	44.01	55.99
8	90,687	4,207	46.29	109,078	4,179	38.31	45.45	54.55
9	34,075	1,621	47.57	90,800	3,596	39.60	27.29	72.71
10	95,512	4,793	50.18	155,658	6,989	44.90	38.03	61.97
11	56,072	3,281	58.51	269,978	12,855	47.61	17.20	82.80
12	61,931	3,804	61.42	95,262	4,806	50.45	39.40	60.60
13	120,725	6,483	53.70	110,515	5,698	51.56	52.21	47.79

Table IV-Continued

BEEF IMPORTS--QUANTITY, VALUE, PRICE, PERCENT MARKET

1969-1975

	Australia			New Zealand			% of Total Sales	
Obser-vation	(cwt) Quantity	($000) Value	($/cwt) Price	(cwt) Quantity	($000) Value	($/cwt) Price	Australia	New Zealand
14	151,499	8,532	56.32	186,370	10,402	55.81	44.84	55.16
15	171,893	11,280	65.62	113,403	6,936	61.16	60.25	39.75
16	140,365	9,220	65.69	67,378	3,968	58.89	67.57	32.43
17	122,987	7,677	62.42	85,336	5,451	63.88	59.90	40.10
18	176,808	14,150	80.03	149,110	11,963	80.23	54.25	45.75
19	131,822	11,336	85.99	152,099	11,826	77.75	46.43	53.57
20	232,326	22,743	97.89	96,129	9,026	93.89	70.73	29.27
21	154,148	15,398	99.89	102,478	9,122	89.01	60.07	39.93
22	55,858	4,638	83.03	120,874	9,037	74.76	31.61	68.39
23	99,303	6,693	67.40	222,312	14,381	64.69	30.88	69.12
24	149,956	10,257	68.40	101,691	6,387	62.81	59.59	40.41
25	172,197	11,219	65.15	93,160	5,211	55.94	64.89	35.11
26	320,159	8,038	25.11	110,316	5,010	45.41	74.37	25.63

Table IV-Continued

BEEF IMPORTS--QUANTITY, VALUE, PRICE, PERCENT MARKET

1969-1975

	Australia			New Zealand			% of Total Sales	
	(cwt)	($000)	($/cwt)	(cwt)	($000)	($/cwt)		
Obser-vation	Quantity	Value	Price	Quantity	Value	Price	Australia	New Zealand
27	55,402	7,683	149.47	223,885	8,391	37.48	18.67	81.33
28	92,244	5,413	58.68	111,865	4,691	41.93	45.19	54.81

Source: Livestock Market Review, 1969-1975.

Imports By Commodities, 1969-1975.

Oceanic beef, which is shipped to Canada primarily by boat, must be boxed five to six weeks in advance, indicating that the level of beef imports in a period are likely not a complete function of the Canadian price in the present period.[1] Indeed, exporters would be naive to allow past prices to dominate their export decisions. There is, thus, a large potential impact of beef shipments to Canada in either creating or intensifying instability in Canadian beef prices because of the "blind" nature of beef imports. The "blind" nature of imports refers to the impossibility of accurately knowing future prices.

The specific hypothesis to be tested is that the quantity of beef imported is primarily an inverse function of it's price. The sign of the Canadian price coefficient is expected to be positive, that of the number of cattle marketings negative, and that of the Canadian hog price positive. Thus, the empirical model to be estimated using the linear OLS method is as follows:

$$Y = B - B1X1 + B2X2 - B3X3 + B4X4 + U \qquad (2)$$

Where:

Y = The quantity of beef imported from Australia and New Zealand.

B = Intercept.

X1 = The price of the imported beef.

---

[1] *Ibid.*

X2 = The price of Canadian cattle.

X3 = The number of cattle marketings in Canada.

X4 = The price of Canadian hogs.

U = Error term.

Empirical Results

The regression model was tested with both the linear and logarithmic forms of the Ordinary Least Squares Method (OLS). The results are given in Table 4-5.

These results indicate that the response of the quantity of beef imported from Australia and New Zealand to Canadian beef and pork prices, the price of Oceanic beef, and the number of cattle marketings is not high. Only the logarithmic form of the Canadian beef price was statistically significant at a reasonable level. The multiple R^2 was low for both functions: 13.95% for the linear form and 18.54% for the logarithmic form.

However, there are problems with the signs of both the number of cattle marketed (BM) and the Canadian hog price (PP) being the opposite as was anticipated. The hog price variable does not cause too much concern because the result was not statistically significant. However, an explanation may lie in the fact that only selected parts of a pig carcass are substituted for beef in manufactured meat products and, further, pork competes with beef in only a fraction of the total demand components for manufacturing beef. For example, pork would not be used for ground beef burgers or all-beef weiners any more than beef would be used in the manufacture of all-pork sausage. Thus, the beef demanded may not be noticeably related to pork prices because it is substitutable with pork over only a narrow

Table V

REGRESSION RESULTS

	BPf	BFc	BM	PP	Mult. R^2	Durban-Watson Statistic
Linear	-3469.14*	12508.63*	1.0627*	-1477.80*	13.95	1.657
	(-1.40)	(1.45)	(1.42)	(-0.51)		
Logarithmic	-0.7128*	1.6782**	3.6932*	-0.2138	16.54	1.191
	(-1.17)	(1.71)	(1.56)	(-0.4)		

*Significant at the 50% level

** Significant at the 90% level

range of the total demand.

The positive sign of the cattle marketing coefficient is perhaps explainable by the nature of the data. Total beef cattle marketings are used because disaggregational data are not available, and the assumption made that the figures were representative of the amount of manufacturing cattle marketings. This may not be true, in fact, biasing the data. That is, total cattle marketings could increase over a period of time while during that same period, the proportion of manufacturing-type beef marketings could fall, giving the regression line a positive slope but not measuring the intended variable.

These empirical results tend to suggest that institutional developments and factors exogenous to the model play important roles in determining the quantity of beef imported into Canada. Governmental export policies in New Zealand and Australia plus the level of those countries beef production, for example, may be more powerful explanatory variables in determining the composition, magnitude, and timing of beef imports into Canada. If so, the current volume of inputs has not been entirely a result of underlying market forces.

Imported Beef--It's Effect on Canadian Beef Prices

As indicated above, the questions of current concern to Canadian restaurants and beef producers are: the effect

changes in the volume of beef imports has on domestic prices to producers and, more importantly: do beef imports influence Canadian beef prices and, if so, to what extent? The data used in the preceding section were compatible to a partial analysis of this question by letting BPc become the dependent variable and IM an independent variable. The regression equation thus became:

$$BPc = F(IM, BPf, BM) \qquad (3)$$

The results of the linear OLS estimator are shown in Table 4-6.

TABLE 4-6

Regression Results II

IM	EPf	BM	Mult. R²	Durban-Watson Statistic
0.00001*	0.23624**	-0.00005**	74.62	2.186
(1.45)	(7.0)	(-2.92)		

* Statistically significant at the 50% level

** Statistically significant at the 99% level

A causal relationaship may not be inferred from the above, but these results, nevertheless, indicate that the price of Canadian cows and the price of imported beef are related in a statistically significant manner.

The level of statistical significance and the sign of the cattle marketings variable were as expected, but are of little relevance to the central thesis of this paper. The quantity of imports (IM) poses a problem because, although not highly significant in the statistical sense, it has asign opposite to that which economic theory would predict. Other than suggesting that this is a reflection of statistical variation, this author can offer no explanation to the problem.

In an attempt to establish a lead-lag relationship the foreign price and quantity imported were lagged one time period and the following model tested using the linear OLS method:

$$P = f\ (PF\ ,\ IM\ ) \qquad (4)$$

Where:

P = Canadian D1 and D2 cattle prices.

PF = Foreign beef prices lagged one time period.

IM = Quantity of beef imported lagged one time period.

TABLE 4-7

Regression Results III

PF	IM	R^2	F-Value
0.21873* (5.62)	0.00000 (0-.54)	57.29	16.07

*Statistically significant at a 95% level.

The coefficient for the IM variable was zero at eight decimal places with the data left untransformed but when reduced by a factor of 10^4, the coefficient became -0.03011.

As indicated in Table 4-7, the Canadian cattle price and the Oceanic beef price lagged one time period are related in a statistically significant manner. An improved model, however, might result from the use of monthly data as opposed to quarterly data but this is beyond the scope of the present study.

CHAPTER V

BEEF PURCHASING BY RESTAURANTS WITHIN THE EDMONTON AREA

Introduction

Restaurants within the Edmonton area are diversified with respect to menus, size, customer turnover, and price of meals. Little information is available which would allow a researcher to aggregate restaurants into differentiable groups in a statistically representative manner; thus quantitative analysis does not lend itself well to the main emphasis of this study. A small number of firms account for the major portion of the sale of hamburgers in Edmonton so it would not likely be accurate to treat all restaurants that sell hamburgers as representative of the business. The same holds true for steakhouses. A small number of specialty steakhouses serve a large flow of customers and it is difficult to compare these to small unspecialized restaurants and hamburger restaurants. Thus it appears that the appropriate option of study would be descriptive analysis of the purchase patterns of major restaurants specializing in beef sales.

Method of Study

Interviews were conducted with ten restaurant firms within the Edmonton area representing a total of thirty-six outlets. The mean number of outlets per firm would be 3.6,

but it should be noted that four of the firms had one outlet, while another had eleven. Interviews were conducted on an informal basis using open-ended questions designed to allow discussion of any salient features that were unanticipated or not specifically asked.

The sample was designed so as to emphasize steakhouses and hamburger restaurants in an attempt to obtain a representative cross-sectional study of these two types of restaurants. This objective was impaired in part by the decision of several major firms not to answer any questions. However, it is believed that a picture of what is currently happening in the trade may be inferred.

Seven of the restaurants were steakhouses, three of which might be described as high quality and high priced restaurants, while the other four would best be described as lower priced family restaurants. The remaining three firms interviewed had one hundred precent of their beef sales in hamburgers.

Classification of Restaurants by Sales

Restaurants were questioned as to what percentage of their sales were in different forms. The forms were arbitrarily separated into sales of: steaks, roast beef, hamburger, ribs, and sandwiches. Ribs, however, were considered for the purposes of the study to be roughly the equivalent of steaks in terms of price and quality. The

objective of this procedure was to classify restaurants that were similar but had different menus.

TABLE 5-1

Sales Breakdown by Restaurant

(Beef Sales, in Percentages)

1976

Restaurant	Steak	Roast Beef	Hamburger	Ribs	Sandwiches	Other	Total
A	50	10	-	25	10	5	100
*B	40	-	-	60	-	-	100
C	100	-	-	-	-	-	100
D	90	10	-	-	-	-	100
E	75-90	-	-	10-25	-	-	100
F	80	-	18	-	2	-	100
G	80	-	20	-	-	-	100
*H	-	-	100	-	-	-	100
I	-	-	100	-	-	-	100
J	1	-	99	-	-	-	100

*These two restaurants also sell seafood and chicken respectively.

TABLE 5-2

Type of Service and Customer Turnover

1976

Restaurant	Estimated Customer Turnover (per week)	Type of Service	
		Self	Provided
A	1,400	X	Y
B	3,000	Y	Y
C	2,000	Y	Y
D	4,000	Y	X
E	2,000	Y	Y
F	4,000	Y	X
G	3,000-4,000	Y	X
H	3,000	Y	X
I	20,000	Y	X
J	3,000	Y	X

Y - indicates YES
X - indicates NO

Table 5-1 illustrates the sales breakdown by restaurant and shows the method of classification.

Customer Turnover

The rapid growth of fast-service restaurants makes this type of comparison particularly useful as a tool of analysis. The type of service provided (self-service or full service) is also noted. Three of the restaurants have a combination of the two because they contain a self-service salad bar. Table 5-2 summarizes the customer turnover and the type of service of each restaurant.

Beef Purchasing Patterns

Overall, restaurants tend to purchase Canadian beef because, as indicated earlier, a large amount of foreign beef does not enter the Edmonton market. Six of the restaurants reported that they purchase Alberta beef almost exclusively with occasional orders of beef from other parts of Canada, the United States, or Oceanic countries. Steakhouses specializing in sales of low priced beef and hamburger restaurants were generally more price conscious and did not insist on Alberta or Canadian beef.

Beef purchases tended to be from purveyors although not exclusively. Table 5-3 outlines in more specific terms the type of supplier used.

Table 5-3 emphasizes the relative lack of importance

the four national packers have with respect to direct sales to restaurants as compared to their relative dominance of sales to retail stores. However, it must be emphasized that the structure of the restaurant supply trade is not static. These findings only indicate recent business trends and changes in economic parameters could alter the situation. The dynamic nature of the industry could create change, for example, if national packers were to adopt a stronger competitive role in sales to restaurants.

Restaurants tend to purchase largely according to immediate demands, rarely purchasing exclusively from one supplier. Five of the ten restaurants have purchased predominantly from one supplier over the last year and only one has had the same source for more than two years. Thus it would appear that aggressive marketing policies by packers could net a larger share of the restaurant supply market, if they so desired.

TABLE 5-3

Sources of Beef

(In Percentages)

1976

Restaurant	Packing Plants Regional	 National	Purveyors	Wholesale Dist.	Other
*A	YES	YES	YES	-	-
B	-	80	20	-	-
C	-	-	100	-	-
D	-	-	-	100	-
E	-	-	100	-	-
F	-	-	100	-	-
** G	YES	YES	-	-	75
H	-	100	-	-	-
I	100	-	-	-	-
J	-	-	100	-	-

*This restaurant was unable to be more specific because it purchased from any packer or purveyor who quoted the lowest price for a given week.

**Data were not complete for this firm. Beef purchased by this firm is predominantly imported beef so it is hypothesized that it is supplied primarily by brokers.

This aspect of restaurant beef procurement was emphasized when restaurants were questioned whether or not they had a preference for contract or random (daily, weekly, monthly) purchases. It was found that restaurants had a preference for short term contracts ranging from weekly to monthly contracts because they wished to avoid being tied to long term prices. Informal (salesmen) buying was used in one case, semi-formal (negotiated) buying was used by five firms, and formal (bid) buying was used by another.[1] Three firms were unable to answer this question due to insufficient information.

One reason for these relatively short term contracts would appear to lie in the volatile nature of wholesale and retail beef prices. Because of weight loss through processing and costs incurred, an increase in the live cattle price creates proportionally larger increases in the wholesale and retail values of beef. Table 5-4 outlines these types of changes.

Restaurants would prefer to be locked into a long term contract if live animal prices were to rise, but if prices were to fall, they would be locked into over-priced beef. Suppliers would prefer to be locked into a long term contract if prices were to fall, but not if they were to rise.

---

[1] For a description of the three types of buying see: L. H. Kotschevar, Quantity Food Purchasing, Second Edition, John Wiley and Sons, pp. 32-33.

TABLE 5-4

Farm Prices and Farm Value Equivalent of the Wholesale Carcass and Retail Cuts, 1974

(excluding by-product values)

(in ¢/lb.)

Live Cattle Price	Wholesale Value (a)	Average Retail Value (b)	Live To Retail Price Spread
35	64.1	81.9	46.9
40	70.2	93.6	53.6
45	78.9	105.3	60.3
50	87.7	117.0	67.0
55	96.5	128.7	73.7
60	105.3	140.4	80.4

Note: (a) Assuming a 57% carcass yield from the live animal.

(b) Assuming a 75% retail yield from the wholesale carcass.

Source: Food Prices Review Board, Beef Pricing, Ottawa, June, 1974, p. 7.

Therefore, this trade-off of interests between restaurants and suppliers results in short term contracts designed to protect firms from short term fluctuations and allow price changes given a long term price trend.

A second reason for short term contracts would appear to originate from the competitive nature of the restaurant supply industry. The four national packers, smaller regional packers, and three large purveyors all compete for markets. Because contracts are short term in nature, considerable incentive and opportunity exists to expand markets but also protect and maintain those already held. Furthermore, because fresh beef has a short term allowance for storage and suppliers have limited storage facilities, a surplus of one supplier may force him to cut prices in an attempt to eliminate excess beef which, in turn, would tend to depress prices in the market. These factors combine with the effect boxed beef has on price instability (as outlined in Chapter III) to create incentive to avoid long term contracts.

Specifications of Beef

It was hypothesized at the outset of the study that restaurants would purchase beef primarily by portion cut and secondarily by primal cut. The results of the interviews are given in Table 5-5.

TABLE 5-5

Type of Cut Purchased By Restaurants

(In Percentages)

1976

Restaurant	Carcass	Primal	Portion	Other
A	-	100	-	-
B	-	-	100	-
C	-	-	100	-
D	-	YES	YES	-
E	-	-	100	-
F	-	100	-	-
G	-	-	100	-
H	-	-	100	-
I	-	-	100	-
J	-	-	100	-

Four of seven steakhouses purchased entirely by portion cut, while two others purchased entirely by primal cut. The seventh, Restaurant D, purchased both depending on price and was unable to differentiate their relative sizes. All three hamburger restaurants purchased pre-made portion controlled beef patties from their suppliers.

Apparently the specialized portion cut service offered by purveyors has been used extensively. The reasons for doing so would seem to be threefold in nature. First, by specifying portion size to suppliers, the restaurant can assure itself a consistent supply of uniform cuts. Second, there would appear to be cost advantages in the assembly line specialized service of purveyors. And third, in the case of a short term supply problem (where the restaurants stock declines) cuts may be acquired quickly from suppliers.

The three steakhouses that purchased by primal cut had individual reasons for doing so. Restaurant A was not specialized in terms of product and used a larger range of beef cuts, thus it had its own butcher to prepare the wide variety of cuts offered. Restaurant D, on the other hand, found that it could accrue cost savings by purchasing whichever was lower priced per unit (primal or portion cut). Restaurant F indicated that it could reduce costs of meat if it purchased primal cuts and carried out the portioning function itself.

Size of Cut

The size of cut purchased is a variable determined by the individual nature of each restaurant. The choice is arrived at by the firm's internal selection of menu, image, and product. Thus, there would not appear to be any overall advantage to beef suppliers to style their production into any specific breed, weight, range or sex of beef animal. However, the trend has been to smaller cuts from lighter loins and ribs which has served to eliminate the advantage of using steers as when heavier weights were in demand.

Fat Quantity

One factor considered in beef purchasing is fat trim. Restaurants maintain rigid controls on the fat cover because if it is in excess, then it is considered waste that is paid for and not sold. Restaurants are very explicit in their specified fat cover.

Previous research by Smith, *et al.*, concluded that under few circumstances were A1 carcasses suitable for the HRI trade because heavy loins and ribs with considerable marbling and finish were being demanded.[1] However, the situation appears to have changed in recent years. The new grading system's specifications indicate that cuts off carcasses with average weights of between 500-699 pounds

---

[1] Smith et. al., *Op. Cit*. p. 27-29.

with fat cover between 0.20 and 0.40 inches would likely be graded A1. Six of the steakhouses set maximum fat cover as being 0.25 inches on at least one cut purchased and four steakhouses specified no greater than 0.25 inches fat cover on all cuts purchased. This would seem to indicate that A1 carcasses are suitable for the HRI trade and that heavier finished cuts are no longer favored in restaurant demand.

Fat content is also an important factor for hamburger restaurants. The standard lean to fat ratio used by all three restaurants interviewed was 85/15. Two reasons exist for the choice of this as an optimum ratio: first, post-cooking shrink would be excessive if the fat quantity were higher and second, this was considered the optimal ratio for ease of preparation.

The restaurant representatives were asked to rank the importantance of a number of factors used for determining beef quality. The factors were: color of lean, fat cover (color, thickness), marbling, texture of lean, flesh firmness, bone condition, aging of beef, sex of animal, age of animal and the grade. Some of these factors are inter-related or partially determined by another. This was done deliberately in order to offer a wide selection of choices. It was expected that subjective assessements not supported by food science literature would be rated as important by some firms.

The results did not support this hypothesis. Of primary

importance to beef purchasing was the grade of carcass. Evidently, restaurants were aware of the grading system although some were unclear on the technical aspects of what different grades measured. Several still believed that beef was graded under the system used prior to 1972, when the current system was adopted. One aspect that was frequently mentioned was that Alberta beef of any grade was superior in flavor to beef from other parts of Canada.[1]

Another factor considered important by most restaurants was the length of aging of the beef. Fourteen to twenty-one days aging was the approplate range usually mentioned.

---

[1] In reality it would be impossible for a restaurant to discover grade or geographical source by looking at a portioned beef cut. A certain amount of business trust between restaurants, purveyors and packers appears to instill enough discipline in the market so that beef is supplied as specified.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

At the time of study, the food service industry was in a state of transition at several levels in the marketing chain. Purveyors had been successful in assuming a share of the restaurant supply market (largely at the expense of packers) due to the growing demand for supplies of individualy specified portion controlled cuts. Packers had adapted to a changing market less noticably and recently have made indications that they will compete more vigorously in this market. At another level, transition was occurring in the growth of high volume specialty restaurants. Most prominent are specialty hamburger outlets and high quality restricted service steakhouses.

The demand for beef eaten away from the home has shown rapid growth in recent years, mostly in these two types of outlets. This study has therefore attempted to concentrate on these two types of outlets although other varieties have also been consulted. The major emphasis was placed upon beef procurement with respect to sources of beef, quality, method of purchase and amount of processing done on the beef.

Conclusions and Recommendations

Beef Quality

1. Beef quality is difficult to determine in an

objective manner. In the beef marketing chain quality often is determined on the basis of subjective measuring methods. Throughout the course of interviews with restaurants reference was made to beef quality in terms of lean and fat color, texture of lean and fat, and the taste advantage of Alberta beef over beef from other parts of Canada and other countries. Yet it is doubtful whether the interviewees could discern, on the basis of sight and taste, any differences between equivalent types of meat. However, subjective quality appraisal remains a factor in beef purchasing.

2. Beef carcasses corresponding to the A1 and A2 Canadian grades appear to fit the specifications demanded by most restaurants; however, they generally receive A3 and A4 carcasses because retail stores purchase most of the A1 and A2 carcasses.

3. The Canadian regulatory system for beef does not supply one measure demanded by restaurants. Aging was emphasized as being an important determinant of quality and often aging periods in excess of 21 days are demanded. It could prove helpful to restaurants if a service were instituted where sub-primal and portion cuts were sealed and stamped with a date indicating when the meat was first entered into the aging process. This could help ensure that restaurants would receive beef aged the specified length of time.

4. It appears that restaurants do not have a clear idea

of the Canadian beef grading system, what it measures and how it may be interpreted. However, they are receiving quality beef largely because of two reasons. First, the Canadian grading system's design provides grade categories to fit most of the specifications outlined by restaurants. Secondly, the actual beef purchase when grades are still indentifiable is made by the purveyor who then determines quality and allocates beef to fit the desired specifications of restaurants.

5. In general terms, many members of the beef marketing system are not aware of scientific research into beef quality. An educational program could be developed to explain the determinants of beef quality and how the Canadian grading system describes aspects of quality.

The HRI Trade and Suppliers

1. Canadian beef production is primarily concentrated in the A grade categories. This type of beef carcass supplies the type of cuts demanded by restaurants. A lighter rib-eye and loin are presently in demand by the HRI trade. This would appear to give a competitive edge to Alberta feeder cattle over American cattle because the average warm carcass weight in Alberta fall within the maximum and minimum desired weight ranges, while American cattle tend to be heavier and have more finish. The standard fat thickness demanded would be approximately 0.25 inches for steaks or ribs while the standard lean to fat ratio for ground beef is

85/15.

2. National packers have a smaller portion of sales to purveyors than would be indicated by their respective total market shares. Regional and local packers sell correspondingly more beef to purveyors.

3. Restaurants tend to purchase by immediate demand or by short term contract rather than become locked into a set long term contract. Moreover, restaurants tend to change suppliers often, depending on where they can get the lowest price. Price competition appeared to be vigorous and commonly was the major factor in the beef purchase decision as reported by restaurants.

4. The large national packers have not been able to control a large share of the restaurant supply business. A reason, asserted several times by restaurants, was that they were less flexible when asked to prepare beef to certain specifications than purveyors and, moreover, they "tended to cut beef to fit their boxes rather than our specifications."

5. Portion-controlled cuts are purchased most widely by Edmonton restaurants, but some also purchase by primal cut.

6. There is almost no information on how much beef actually goes into the different segments of the HRI trade. Thus a definite need exists for governments to record and publish data outlining the amounts of beef processed and sold to the HRI trade.

7. In the United States, the division point between the loin and ribs (for primal cuts) is between the twelfth and thirteenth ribs. Canadian practices differ in that the ribs are separated from the loin between the eleventh and twelfth ribs. Therefore Canadian primal cuts have higher loin prices for lower quality meat because of the extra rib attached to the loin. American beef is thus more attractive because it contains a higher proportion of high quality meat on the loin. Canadian meat processors should therefore change to American specifications so that this differentiating feature is eliminated.

Imported Beef

1. Beef imports from New Zealand and Australia do not appear to be dependent upon the price levels of hogs and cattle in Canada, the number of cattle marketings in Canada, nor the price they sell at. The study indicates that beef will arrive into Canada from these countries over a broad range of prices. Australia and New Zealand appear willing to export into markets as much beef as possible at low prices when they do not face import quotas.

2. A second result determined by this study is that import prices of foreign beef and Canadian cattle prices are statistically interrelated, suggesting some interdependence. The foreign beef price lagged one time period yielded a statistically significant coefficient further implying that

this relationship was with the foreign beef price being the lead variable and the Canadian cattle price the lag variable. However, Oceanic beef competes directly with Canadian D3 and D4 grades, indicating that the price impact is more pronounced within these grades. It appears likely that other Canadian cattle prices would be influenced to a lesser degree.

Recommendations Concerning Further Research

It is recommended that further research in this area be of a descriptional nature, at least initially. Many gaps in the present state of knowledge about this aspect of beef demand exist. Until an institutional understanding of the HRI trade and its interrelations with other sections of the livestock-meat industry is developed, quantitative research will be restricted.

An analysis using statistical methods would likely be difficult due to the organizational nature of the food service industry in terms of outlets and the demand they serve. Of the total demand for food away from the home it would appear, at first glance, that certain sub-markets exist, each with a separate identifiable demand. Examples of these sub-markets would be: fast-food outlets such as hamburger, fish, or chicken outlets; high quality full service restaurants; and cafeteria-style restaurants in institutions. However, market boundaries are not clearly delineated over product, space or time. In contrast, the

boundaries are fuzzy and constantly in a state of flux as variables such as consumer demand change.

Another problem to be faced by the researcher is that once an arbitrary model for categorizing restaurants is developed, the number of firms on each sub-category may be small. Aggregating the categories into statistically workable size could result in generalizing two types of restaurants that are actually dissimilar.

Efforts should also be made to extend the geographical area of the study to a provincial basis. In addition, comparisons between cities could be made. On a national basis a study is also possible because a number of major restaurants and beef suppliers are national in scope.

References

Agriculture Canada, *Handbook of Food Expenditures, Prices and Consumption*, Economics Branch Publication, Number 75/6, May, 1975.

Agriculture Canada, *Livestock Market Review 1969-1975, Published by Markets Information Section, Livestock Division.*

American Meat Institute Foundation, *The Science of Meat and Meat Products*, W.H. Freeman and Co., San Francisco, 1960.

Berg, R.T., "Lean, Fat, or Bone in Beef Cattle?", Paper presented at the 11th Stockman's School, San Antonio, Texas, January, 1974.

Birch, Alfred L., "An Econometric Analysis of the Tariff In Canadian- American Cattle Trade", Unpublished M.Sc. Thesis, Department of Rural Economy, The University of Alberta, Edmonton, 1974.

Boas, Max, Chain, Steve, *Big Mac, "The Unauthorized Story of McDonalds"*, E.P. Dutton and Co., Inc., New York, 1976.

Braschler, Curtis H., Alexander, Warren D, Welch, John, "Meat Buying in the Missouri Restaurants", University of Missouri, College of Agriculture, Research Bulletin 821, Columbia, Missouri, 1963.

Cole, H.H. (Ed.), *Introduction to Livestock Production*, W.H. Freeman and Company, San Francisco, 1966.

Couch, Brian, "Hold the Lettuce", *Financial Post* 69:19, October 18, 1975.

Davies, Charles, "Fast Food Investors Get Indigestion," *Financial Post* 67:19-20, May 19, 1973.

Dawson, Jim, "Canada's Beef Trade". Unpublished Report, Alberta Department of Agriculture, Edmonton.

Dodds, Harold, "Canada Gains in HRI Trade" *Cattlemen: The Beef Magazine*, March, 1976, p.10.

Dodds, Harold, "Meat Imports Bring Clash" *Cattlemen: The Beef Magazine*, Aug, 1976, p 18, 33.

Food Price Review Board, *Beef Pricing*, June, 1974.

Gifford, M.N., "A Net Importer In 1969: Canada's Agricultural Trade In Perspective", *Canadian Farm Economics*, Vol. 5, No. 4, Oct., 1970.

Gracy, C.A., "Beef-Implications and Alternatives" Canadian

Agricultural Outlook Conference, Ottawa, 1974, Canadian Farm Economics, Vol 9, No. 1, Feb., 1974.

Haney, Harry D., "Feeder Cattle Marketing In Southern Alberta", Unpublished M.Sc. Thesis, Department of Rural Economy, University of Alberta, Edmonton, 1974.

Hawkins, M., McCormick, R., "The Australian Beeef Industry", Report No. 10, Unpublished Report to the Alberta Government.

Hawkins, M., McCormick, R, "A Study of the New Zealand Livestock and Meat Industry," Unpublished Report to Alberta Agriculture.

Hawrysh, Zenia J., Berg, R.T., Howes, A.D., "Eating Quality of Mature Marbled Beef", Canadian Institute of Food Science and Technology Journal, Vol. 8, No. 1, 1975, pp. 30-34.

Hawrysh, Z.J., Howes, A.P., Berg, R.T., "Eating Quality of Beef From Steers Fed Full or Restricted Levels of Moisture-Treated Barley.", Canadian Journal of Animal Science 55(2), 1975, pp. 179-185.

Juillerat, M.E., Kelly, Robert F., "Quality Traits Associated With Consumer Preference For Beef", Journal of Food Science, Vol 36, 1971, pp. 770-773.

Kahrl, William L., Introduction to Modern Food and Beverage Service, Prentice Hall Inc., New Jersey, 1976.

Kohls, R.C., Downey, W.D., Marketing of Agricultural Products, The MacMillan Company, New York, 1972.

Kotas, Richard, Davis, Bernard, Food Cost Control, International Textbock Company Limited, Great Britain, 1973.

Kotschevar, Lendal H., Management by Menu, National Institute for the Food Service Industry, Chicago, 1975.

Kotschevar, Lendal H., Quantity Food Purchasing (2nd ed.) John Wiley and Sons, Inc., United States, 1975.

Kulshreshtha, S.N., Wilson, A.G., "Long-Swing Hypothesis for Cattle and Hog Output and Prices in Canada: An Application of Spectral Analysis" Canadian Journal of Agricultural Economics, Vol. 22, No. 1, Feb. 1974, pp 12-25.

Leckie, H.K., "Canada's Meat Packing Industry", in Canada's Beef Industry: Proceedings of the 1970 Workshop of the Canadian Agricultural Economics Society, held at Banff, Alberta, June, 1970. Canadian Journal of Agricultural Economics, 1970, pp. 20-52.

Levinson, Charles, Food and Beverage Operation, Prentice-Hall Inc., New Jersey, 1976.

MacEachern, G.A., Prospects for Beef, Pork and Grain Production In Canada, Agricultural Economics Research Council of Canada, Ottawa.

McIntyre, Hugh, "Food-Service Firms Report 35% Sales Jump, Financial Post 67:32, Sept 29, 1973.

McLamore, James, W., "Upcoming: 50% Meals Eaten Out?" Chain Store Age Executive, September, 1975, pp 71-73.

McLean-Butlen, A.J., Veeman, M.M., Hawkins, M.H., Beef Packing and the Cattleman, Bulletin 15 (General Information) Department of Rural Economy, University of Alberta, Edmonton.

Marshall, R.G., Assessment of Demand, Supply and Trade Relationships Affecting Cattle, Beef, Hogs and Pork Prices in Canada, Food Price Review Board, Ottawa, May, 1974.

Martin, A.A., Fredeen, H.T., Weiss, G.M.F "Tenderness of Beef Longissimus Dorsi Muscle From Steers, Heifers and Bulls As Influenced By Source Post-Mortem Aging and Carcass Characteristics", Journal of Food Science, Vol. 36, 1971, pp. 619-623.

Maxwell, John C. "Fast-Food Field Had 15% Gain in 1974 Sales", Advertising Age, June 30, 1975, p. 40.

Norris, Helen L., Harrison, Dorothy L., Anderson, Lois L., Van Welch, Beltina, Tuma, Harold J., "Effects of Physiological Maturity of Beef and Marbling of Rib Steaks on Eating Quality", Journal of Food Science, Vol. 36, 1971, pp. 440-444.

Paternote, William L., "Supplying the Food-Service Industry" Financial Analysts Journal, Nov./Dec. 1973, Vol. 29, No. 6, pp. 50-57, 80.

Payne, F.E., "Beef Outlook", Canadian Farm Economics, Vol. 9, No. 1: Feb, 1974, Proceedings of the Canadian Agricultural Outlook Conference, Ottawa, 1974.

Peters, C.W., Reed, Robert H., Dowe, Stephen, M, Clark, Richard H., Meat Purchases and Preferences in Hawaii, Agricultural Economics Bulletin 8, University of Hawaii, College of Agriculture and Hawaii Agricultural Experiment Station, June, 1954.

Prost, E., Petczynska, E., Kotula, A.W., "Quality Characteristics of Bovine Meat: Beef Tenderness in Relation to Individual Muscles, Age and Sex of Animals and Carcass Quality Grade", Journal of Animal Science, Vol. 41, No. 2, 1975, pp 541-547.

Report of the Commission of Inquiry Into the Marketing of

Beef and Veal, Printing and Publishing Supply and Service Canada, Catalogue No. CP32-22, 1976.

Restrictive Trade Practice Commission, *Report Concerning the Meat Packing Industry and the Acquisition of Wilsil Limited and Calgary Packers Limited by Canada Packers Limited*, Department Justice, Ottawa, 1961.

Smith, G.C., Arango, T.C., Carpenter, Z.L., "Effects of Physical and Mechanical Treatments on the Tenderness of the Beef Longissimus" *Journal of Food Science*, Vol. 36, 1971, pp. 445-449.

Smith, Kenneth, "The New Canadian Beef Grades", Unpublished M. Sc. Thesis, Department of Rural Economy, The University of Alberta, Edmonton, 1974.

Smith, K.D., Berg, R.T., Hawkins, M.H., Stiles, M.E., McFadyen, S.C., *The New Beef Grades*, Department of Rural Economy Bulletin (Applied Research), University of Alberta, Edmonton, 1975.

St. John's Edmonton Reports, "War Looms in Cities Fast-Food Trade as McDonald's Breaks Franchise Tie-Up", March 17, 1975, pp. 20-23.

Thompson, J.R., "Dark-Cutting Beef - A Problem?" *Agricultural Bulletin*, Summer , 1974, pp. 40-41.

Tuma, H.J., Hendrickson, R.I., Odell, G.V., Stephens, D.F., "Variations in the Physical and Chemcial Characteristics of the Longissimus Dorsi Muscle From Animals Differing In Age" *Journal of Animal Science*, Vol. 22, No. 2, May, 1963, pp. 354-357.

Vaughn, Charles, L., " *Growth and Future of the Fast-Food Industry*" Address to Annual Marketing Conference, Atlantic Pizza Delight Franchises, Hilton Hotel, Montreal, April 19, 1976.

Vaughn, Charles L., *The Vaughn Report on Franchising of Fast Food Restaurants*, Farnsworth Publishing Company, Inc., New York. 1970.

Walter, J., Goll, D.E., Kline, E.A., Anderson, C.P., Carlin, A.F, "Effect of Marbling and Maturity on Beef Muscle Characteristics", *Food Technology*, Vol. 19, No. 5, May, 1965, pp 159-167.

Wenzel, L. Richard, "Fast-Food Chains in Better Shape", *Financial Post*, 65:28, March 20, 1971.

Williams, Willard F., Stout, Thomas T., *Economics of the Livestock-Meat Industry*, The MacMillan Company, New York, 1964.

Yeates, N.T.M., Modern Aspects of Animal Production, Butterworths, Inc., London, 1965.

Yorgason, U.N., Canada's Livestock-Meat System, Agricultural Economic Research Council of Canada, 1973.

Appendix A

Department of Rural Economy
University of Alberta

Packing Plant Interview

Confidential Information

A. General Information

1. Name of Firm: ______________________________

2. Address of Firm: ______________________________

3. Interviewer and Interviewee: ______________________

4. Date: ______________

B. Source of Beef and Specifications

5. Percentage of beef procured by geographic source.

Source	Percent of Beef Purchased Over Last Year	Grade	Fresh/Frozen/Live
Alberta			
Rest of Canada			
United States			
Australia			
New Zealand			
Other			

6. Specifications of beef procured - in percentage terms

		Sex M/F	Hoof	Carcass (bone in)	Cuts (bone in)	Boneless	Pickled Cured	Canned	Trimmings
Alberta	A1								
	A2								
	A3								
	A4								
	B								
	C								
	D								
	E								
Rest of Canada	A1								
	A2								
	A3								
	A4								
	B								
	C								
	D								
	E								
United States									
Australia									
New Zealand									
Other									

Note: Indicate when meat is purchased frozen with...(F)

7. When your company purchases Canadian beef does:

a) Sex matter? Why or why not? ______________________

____

____

b) Weight of Carcass matter? Why or why not? ______________________

____

____

8. When your company purchases foreign beef does:
   a) Sex matter? Why or why not?
   b) Weight of carcass matter? Why or why not?
   c) Country of origin matter? Explain:
   d) Fat quantity matter? Explain:

9. When purchasing foreign beef, which factors are most important? Why?
   a) Price
   b) Consistent Supply
   c) Uniformity of product
   d) Quality
   e) Other

10. What processing is done to beef? In percentages.

Source		Broken (Wholesale cuts)	Boned	Ground	Manufactured	Left in Carcass Form
Alberta	A1					
	A2					
	A3					
	A4					
	B					
	C					
	D					
	E					
Canada	A1					
	A2					
	A3					
	A4					
	B					
	C					
	D					
	E					
United States						
Australia						
New Zealand						
Other						

11. Is any artificial tenderizing done by your firm? Describe.

Why? ____

____

____

C. Markets

12. Indicate the percentages of each source that is sold to the respective markets and the predominant form it is shipped in.

Source	Retail Stores	Wholesale Distributors	Purveyors Processors	Restaurants	Hotels	Institutions	Export	Other
Alberta A1								
A2								
A3								
A4								
B								
C								
D								
E								
Canada A1								
A2								
A3								
A4								
B								
C								
D								
E								
United States								
Australia								
New Zealand								
Other								

13. Direct sales to restaurants.

Source	M/F	Carcass (bone in)	Cuts (bone in)	Boneless	Pickled Cured	Cooked	Canned	Ground Patties	Other
Alberta A1									
A2									
A3									
A4									
B									
C									
D									
E									
Canada A1									
A2									
A3									
A4									
B									
C									
D									
E									
United States									
Australia									
New Zealand									
Other									

14. Do the following factors matter significantly to restaurants' meat specifications? Why or why not?

a) Sex of animal: ____________________

____

b) Grade: ____________________

____

c) Weight of carcass: ____________________

____

d) Size of cuts (if portion cut):

e) Geographic source:

f) Aging:

g) Other:

15. How long is beef aged in your plant?

16. How does your firm deliver portion cut, wholesale cut, and boneless beef to customers?

	Boxed	Cryovac	Frozen
Portion cut			
Wholesale cut			
Boneless			

17. What type of arrangements dominate business transactions with restaurants. Why?

a) Contract-time period:

b) Random sales:

c) Other:

18. Does your firm consider the restaurant trade profitable to supply?

19. What percentage of domestic beef used by your firm is purchased from:

National Packers ____
Local Packers ____
Wholesale Distributors ____
Brokers and Jobbers ____

20. Through what agencies is the foreign beef imported into this country?

____

____

____

APPENDIX B

Merle Faminow

DEPARTMENT OF RURAL ECONOMY
UNIVERSITY OF ALBERTA

Restaurant Interview

Confidential Information

A. General

1. Name of Firm ______________________________

2. Address of Firm ______________________________

3. Interviewer and Interviewee ______________________________

4. Date ______________

B. Source of Beef and Specifications

5. Please indicate what outlets your firm purchases beef from.

	Packing Plant Local	 National	Purveyor	Broker or Jobber	Wholesale Distributor	Other
Alberta						
Rest of Canada						
United States						
Australia						
New Zealand						
Other						

6. Has your firm historically purchased from these sources or has it changed? ______________________________

____

____

7. Why does your firm procure beef from the sources listed above?

____

____

____

____

8. Please indicate the specifications of the beef procured.

	Sex	Carcass	Primal Cuts	Portion Cuts	Pickled Cured	Canned	Trimmings	Other
Alberta - A Grade B C D E								
Rest of Canada A B C D E								
United States								
Australia								
New Zealand								
Other								

Indicate Frozen (F)

9. What advantages are there in purchasing in the form your firm does?

10. Is your firm integrated into the production or processing of beef? Explain?

11. When purchasing Canadian beef does:

a) sex matter?

b) weight of carcass matter?

c) size of cut matter?

d) fat quantity matter?

e) age of animal matter?

12. Is Albertan or Canadian beef consistently available in the specifications desired by your firm? ______

13. When purchasing foreign beef does:

a) sex matter? ______

b) weight of carcass matter? ______

c) size of cut matter? ______

d) fat quantity matter? ______

e) age of animal matter? ______

14. When purchasing foreign beef do you specify a preferred country of origin? Explain. ______

15. If you purchase foreign/Canadian beef in competition with Canadian/foreign beef please indicate the reasons. ______

C. Purchasing Procedures

16. What are your firm's buying procedures? Why?

a) Informal buying (Salesman, phone) ______

b) Negotiated buying (semi-formal) ______

c) Bid buying (formal) ______

17. Does your firm have a preference for contract purchasing or random (daily, weekly, monthly) purchases? Why? ______

18. Does your firm purchase by description, inspection, or other? Explain.____

____

____

19. Which factors determines quality in the purchase decision of your firm? Explain.

a) color ____

b) fat cover ______________________________________

c) marbling _______________________________________

d) texture ____

e) flesh firmness ___________________________________

f) bone condition ___________________________________

g) aging ____

h) sex of carcass ___________________________________

i) age of animal ____________________________________

j) grade ____

20. Is any artificial tenderizing done on your beef? Explain ________

____

____

21. What is the maximum fat cover allowed by your firm? Explain ______

____

22. With ground beef what is the minimum lean/fat ratio allowable? Explain ____

____

23. What is your firm's policy towards deviations from the standard product in terms of:

a) dark cutters _____________________________________

b) under finished beef _______________________________

c) over finished beef ________________________________

d) over fat ground ___________________________________

e) other ____

24. Does your firm insist on receiving beef in the following forms:
    a) Cryovac ______________________
    b) Vacuum pack ______________________
    c) Frozen ______________________

25. Is payment made on suppliers weights or delivered weights? ______

____

D. Sales

26. What portion of your firm's total beef sales are in the following categories?

Steak	Roast-Beef	Hamburger	Ribs	Sandwiches	Other

27. What would you estimate your customer turnover to be? __________

____

28. What adjustments are made to account for short-run changes in the cost of beef? Explain.
    a) emphasis high profit items ______________________
    ____
    b) change menu prices ______________________
    ____
    c) change portion size ______________________
    ____
    d) other ______________________
    ____

APPENDIX C

Grade Specifications For New Beef Carcass Grading System

Grade	Maturity Class	Longissimus Dorsi			Fat Covering			Visual Appraisal Muscling	Ribbon Brand Color
		Color	Texture	Marbling	Color	Texture	Distribution		
A1 A2 A3 A4	I Youthful	Bright red	Firm and fine-grained	At least slight	White or slightly tinged with reddish or amber	Firm	Extends well over exterior surface but may be somewhat lacking on the hips or chucks.	Free from marked deficiency in muscling (medium to large ribeye)	Red
B1 B2 B3 B4	I Youthful	Bright red to medium dark	Moderately firm to somewhat coarse	No minimum	White to a yellowish tinge	Firm or slightly soft	Somewhat lacking on hips and chucks.	Free from marked deficiency in muscling (medium to large ribeye)	Blue
C1	I & II Youthful & Intermed.	Bright red to medium dark	Fine-grained to moderately coarse		White to pale yellow	Firm to soft	At least a light covering over most of exterior surface. No excess proportion.	Low medium to excellent. Better muscling as age approaches maximum.	Brown
C2	I & II Youthful & Intermed.	Bright red to dark	Coarse, sinewy, soft or sticky		White to lemon yellow	Firm to soft	At least a slight covering over ribs and loins. No excess proportion.	Deficient to excellent	Brown
D1	III Mature				White to pale yellow	Firm	Extends well over ribs and loins and moderately over hips and chucks. No excess proportion.	Good to excellent	Black
D2	III Mature				White to lemon yellow	Slightly soft	Cover most of exterior surface. No excess proportion.	Medium	Black
D3	III Mature				White to deep lemon yellow	Soft	Light covering over loins and ribs with slight amount over chucks and hips. No excess proportion.	Fair	Black
D4	I, II & III						Little or no fat or excessively finished.	Poor Very deficient	Black
E	I, II & III	Dark	Coarse, sticky					May include youthful animals having pronounced masculinity.	Black

NEW BEEF GRADING SYSTEM

FAT & WEIGHT TABLES

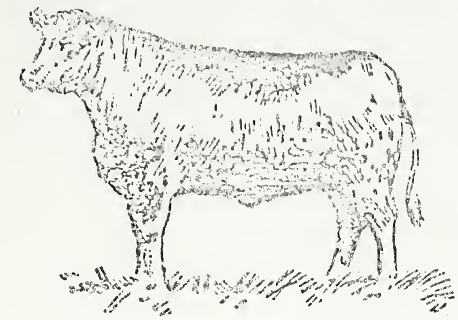
Fat Level for Canada A

Warm Carcass Weight - Pounds -	1 in.	2 in.	3 in.	4 in.
300 - 499	.20 - .30	.31 - .50	.51 - .70	over .70
500 - 699	.20 - .40	.41 - .60	.61 - .80	over .80
700 and over	.30 - .50	.51 - .70	.71 - .90	over .90

Fat Level for Canada B

Warm Carcass Weight - Pounds -	1 in.	2 in.	3 in.	4 in.
300 - 499	.10 - .30	.31 - .50	.51 - .70	over .70
500 - 699	.10 - .40	.41 - .60	.61 - .80	over .80
700 and over	.20 - .50	.51 - .70	.71 - .90	over .90

FROM STEER TO BEEF



A good steer weighing 1,000 lb. alive
and dressing 54%
yields a 540 lb. carcass.

The remaining 460 lb. is composed of about 165 lb. hide, fats, other by-products and 295 lb. of valueless material.

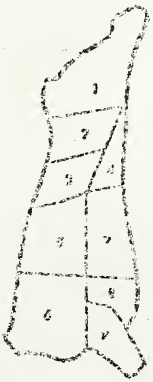
The amount of carcass beef yielded by an animal is termed dressing percentage. Beef-type animals on the average dress 52 to 54% (chilled defatted basis).

Dressing percentage is influenced by:
(a) amount of fill, (b) type of animal, (c) degree of finish, (d) cleanliness of hide and (e) sex of animal.

Dressing Percentage Affects Live Price

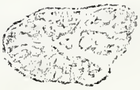
Dressed Beef Price per 100 lb.	Live Value per 100 lb. of cattle dressing:			
	48%	50%	52%	55%
$30.00	$14.40	$15.00	$15.60	$16.50
40.00	19.20	20.00	20.80	22.00
50.00	24.00	25.00	26.00	27.50

CARCASS SHOWING WHOLESALE CUTS



Hind Quarter
1—Round
2—Steak Piece or Sirloin Butt
3—Short Loin
4—Flank

Fore Quarter
5—Rib
6—Chuck
7—Plate
8—Point Brisket
9—Shank

RETAIL CUTS		Yield Per Carcass (Approx.) lb.	%
HIGHER PRICE CUTS		lb.	%
Porterhouse		16	3
T-bone		11	2
Wing or Club		16	3
Sirloin		38	7
Sirloin tip		22	4
Rolled Rib		38	7
		141	26
MEDIUM PRICE CUTS			
Round		65	12
Rump		27	5
		92	17
LOWER PRICE CUTS			
Short (cross) rib		38	7
Blade (boneless)		38	7
Shoulder		19	3½
Hamburg and stew beef		109	20½
		204	37½
TOTAL SALEABLE MEAT per 540 lb. carcass equals		437	80½
Waste (bones, suet, shrink)		103	19½

Source: Meat Packers Council Of Canada

DATE DUE

1977 THESIS

c.2

AUTHOR

Faminow, Merle D.

TITLE Beef Procurement by Edmonton Restaurants.

DATE ISSUED TO